

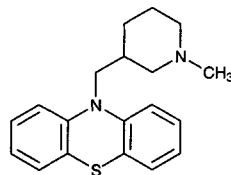
**OTHER SUBSTANCES****Simultaneous:** benzocaine, tyrothricin**Noninterfering:** gramicidin**REFERENCE**

Caraballo,I.; Fernandez-Arevalo,M.; Holgado,M.-A.; Vela,M.-T.; Rabasco,A.-M. A rapid HPLC method for the quantification of tyrothricin, menthol, and benzocaine in pharmaceutical formulations, *J.Pharm.Sci.*, **1994**, *83*, 1147–1149.

**SAMPLE****Matrix:** solutions**HPLC VARIABLES****Column:** 250 × 4.6 Zorbax SAX**Mobile phase:** MeOH:buffer 50:50 (Buffer was 180 mM Na<sub>2</sub>HPO<sub>4</sub> adjusted to pH 3.00 ± 0.05 with 180 mM orthophosphoric acid. Pass mobile phase through a 250 × 4.6 25–40 μm silica (HPLC Technology) column to saturate it with silica.)**Flow rate:** 1**Detector:** UV 253**CHROMATOGRAM****Retention time:** 2.8**OTHER SUBSTANCES****Simultaneous:** cromolyn, minocromil, nedocromil, quinoline yellow, saccharin, salicylic acid**Interfering:** acetaminophen, albuterol, aspartame, aspirin, beclomethasone dipropionate, caffeine, isoproterenol, reproterol, riboflavin, sorbitan trioleate, terbutaline, theophylline**REFERENCE**

Baker,P.R.; Gardner,J.J.; Wilkinson,D. Automated high-performance liquid chromatographic method for the determination of nedocromil sodium in human urine using bimodal column switching, *J.Chromatogr.B*, **1995**, *668*, 59–65.

# Mepazine

**Molecular formula:** C<sub>19</sub>H<sub>22</sub>N<sub>2</sub>S**Molecular weight:** 310.46**CAS Registry No.:** 60-89-9**Merck Index:** 5892**SAMPLE****Matrix:** solutions**Sample preparation:** Prepare a 10 μg/mL solution in MeOH, inject a 20 μL aliquot.**HPLC VARIABLES****Column:** 125 × 4.9 Spherisorb S5W silica**Mobile phase:** MeOH containing 10 mM ammonium perchlorate and 1 mL/L 100 mM NaOH in MeOH, pH 6.7**Flow rate:** 2**Injection volume:** 20**Detector:** E, LeCarbone, V25 glassy carbon electrode, + 1.2 V**CHROMATOGRAM****Retention time:** 4.4

## OTHER SUBSTANCES

**Also analyzed:** acebutolol, acepromazine, acetophenazine, N-acetylprocainamide, albuterol, alprenolol, amethocaine, amiodarone, amitriptyline, antazoline, atenolol, azacyclonal, bamethan, benactyzine, benperidol, benzethidine, benzocaine, benzocetamine, benzphetamine, benzquinamide, bromhexine, bromodiphenhydramine, bromperidol, brompheniramine, brompromazine, buclizine, bufotinine, bupivacaine, buprenorphine, butacaine, butethamate, chlorcyclizine, chlorpheniramine, chlorphenoxamine, chlorprenaline, chlorpromazine, chlorprothixene, cimetidine, cinchonidine, cinnarizine, clemastine, clomipramine, clonidine, cocaine, cyclazocine, cyclizine, cyclopentamine, cyproheptadine, deserpidine, desipramine, dextromoramide, dextropropoxyphene, dicyclomine, diethylcarbamazepine, diethylpropion, diethylthiambutene, dihydroergotamine, dimethindene, dimethothiazine, diphenhydramine, diphenoxylate, dipiprone, diprenorphine, dipyrindamole, disopyramide, dothiepin, doxapram, doxepin, doxylamine, droperidol, ephedrine, ergocornine, ergocristine, ergocristinine, ergocryptine, ergometrine, ergosine, ergosinine, ergotamine, ethopropazine, etorphine, etoxeridine, fenethazine, fenfluramine, fenoterol, fentanyl, flavoxate, fluopromazine, flupenthixol, fluphenazine, flurazepam, haloperidol, hydroxyzine, hyoscine, ibogaine, imipramine, indapamine, iprindole, isothipendyl, isoxsuprine, ketanserine, laudanosine, lidocaine, lofepramine, loxapine, maprotiline, mecamlamine, meclorphenoxate, meclozine, medazepam, mephentermine, mepivacaine, meptazinol, mepyramine, mesoridazine, metaraminol, methadone, methamphetamine, methapyrilene, methdilazene, methotrimeprazine, methoxamine, methoxyphenamine, methoxypromazine, methylephedrine, methylexgonovine, methysergide, metoclopramide, metopimazine, metoprolol, mianserin, morazone, nadolol, nalorphine, naloxone, naphazoline, nicotine, nifedipine, nomifensine, nortriptyline, noscapine, orphenadrine, oxeladin, oxprenolol, oxymetazolin, papaverine, pargyline, penbutolol, pentazocine, penthienate, pericyazine, perphenazine, phenadoxone, phenampromide, phenazocine, phenbutrazate, phendimetrazine, phenelzine, phenglutarimide, phenindamine, pheniramine, phenmetrazine, phenomorphan, phenoperidine, phenothiazine, phenoxybenzamine, phentolamine, phenylephrine, phenyltoloxamine, physostigmine, pimindine, pimozone, pindolol, pipamazine, pipazethate, piperacetazine, piperidolate, pipradol, pirenzepine, piritramide, pizotifen, practolol, pramoxine, prazosin, prenallylamine, prilocaine, primaquine, proadifen, procainamide, procaine, prochlorperazine, procyclidine, proheptazine, prolintane, promazine, promethazine, pronethalol, properidine, propiomazine, propranolol, prothipendyl, protriptyline, proxymetacaine, pseudoephedrine, pyrimethamine, quinidine, quinine, ranitidine, rescinnamine, sotalol, tacrine, terazosin, terbutaline, terfenadine, thenylamine, theophylline, thiethylperazine, thiopropazate, thioproperazine, thioridazine, thiothixene, thonzylamine, timolol, tocanide, tolpropamine, tolycaine, tranlycypromine, trazodone, trifluoperazine, trifluoperidol, trimeperidine, trimeprazine, trimethobenzamide, trimethoprim, trimipramine, tripeleminamine, triprolidine, tryptamine, verapamil, xylometazoline

## REFERENCE

Jane, I.; McKinnon, A.; Flanagan, R. J. High-performance liquid chromatographic analysis of basic drugs on silica columns using non-aqueous ionic eluents. II. Application of UV, fluorescence and electrochemical oxidation detection, *J. Chromatogr.*, **1985**, 323, 191-225.

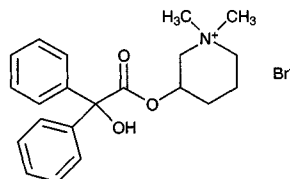
# Mepenzolate bromide

**Molecular formula:** C<sub>21</sub>H<sub>26</sub>BrNO<sub>3</sub>

**Molecular weight:** 420.35

**CAS Registry No.:** 76-90-4

**Merck Index:** 5893



## SAMPLE

**Matrix:** urine

**Sample preparation:** Condition a 500 mg 14 mL 40 µm CCX-2 cation-exchange SPE cartridge (Worldwide Monitoring) with two 2.5 mL aliquots of MeOH, two 2.5 mL aliquots of water, and two 2.5 mL aliquots of 100 mM pH 7.00 phosphate buffer, do not allow to dry. 5 mL Urine + 3 mL 100 mM pH 7.00 phosphate buffer + 5 mL water, centrifuge at 800 g for 5 min, add to the SPE cartridge, wash with 5 mL MeOH, wash with 5 mL water, dry under vacuum for 5 min, elute with 4 mL MeOH:500 mM pH 3.00 ammonium acetate 95:5 (all flow rates were 1-2 mL/min). Evaporate the eluate under a stream of nitrogen at 60°, reconstitute in 100 µL MeOH, inject a 10 µL aliquot.

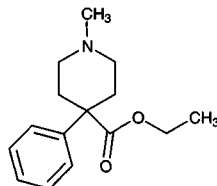
**HPLC VARIABLES****Column:** 150 × 4.1 10 µm LiChroma (Chromatographic Specialties)**Mobile phase:** MeOH:50 mM pH 3.0 ammonium acetate 80:20**Flow rate:** 0.8**Injection volume:** 10**Detector:** MS, Sciex API III triple quadrupole, ion spray interface, split column effluent 95:5 before entering detector, nebulizing gas air at 550 kPa, collision gas argon, curtain gas nitrogen, positive-ion mode, *m/z* 340 and 130**CHROMATOGRAM****Retention time:** 2.1**Internal standard:** mepenzolate**OTHER SUBSTANCES****Extracted:** glycopyrrolate**KEY WORDS**

SPE; horse; mepenzolate is IS

**REFERENCE**

Matassa, L.C.; Woodard, D.; Leavitt, R.K.; Firby, P.; Beaumier, P. Solid-phase extraction techniques for the determination of glycopyrrolate from equine urine by liquid chromatography-tandem mass spectrometry and gas chromatography-mass spectrometry, *J. Chromatogr.*, **1992**, 573, 43–48.

# Meperidine

**Molecular formula:** C<sub>15</sub>H<sub>21</sub>NO<sub>2</sub>**Molecular weight:** 247.34**CAS Registry No.:** 57-42-1, 50-13-5 (HCl)**Merck Index:** 5894**Lednicer No.:** 1 300**SAMPLE****Matrix:** blood

**Sample preparation:** 1 mL Serum + 200 ng doxepin or desipramine + 100 µL 1 M NaOH + 9 mL freshly prepared hexane:isoamyl alcohol 99:1, shake vigorously for 5 min, centrifuge. Remove 8.5 mL of the organic phase and add it to 200 µL 50 mM HCl, shake well for 1 min, centrifuge, inject a 50 µL aliquot of the aqueous phase.

**HPLC VARIABLES****Column:** 300 × 4 µm Bondapak phenyl**Mobile phase:** MeCN:0.01% phosphoric acid containing 0.01% NaCl 35:65, final pH 2.8**Flow rate:** 1.5**Injection volume:** 50**Detector:** UV 210**CHROMATOGRAM****Retention time:** 5.4**Internal standard:** doxepin (12.2), desipramine (14.2)**Limit of detection:** 10 ng/mL**OTHER SUBSTANCES****Extracted:** cocaine, dextromoramide, methadone, normeperidine, norpropoxyphene, pentazocine, propoxyphene

**Simultaneous:** amitriptyline, buprenorphine, chlorpromazine, codeine, desmethyldoxepin, diphenhydramine, ephedrine, imipramine, nortriptyline, oxazepam, oxycodone, pericyazine, pheniramine, propranolol, quinine, thiopropazate, thioridazine

---

**KEY WORDS**

serum

---

**REFERENCE**

Hackett,L.P.; Dusci,L.J.; Ilett,K.F. The analysis of several nonopiate narcotic analgesics and cocaine in serum using high-performance liquid chromatography, *J.Anal.Toxicol.*, **1987**, *11*, 269–271.

---

**SAMPLE**

**Matrix:** blood

**Sample preparation:** Condition a 1 mL BondElut C18 SPE cartridge once with 1 M HCl, twice with MeOH, and once with water, remove the liquid completely with suction each time. Add 250  $\mu$ L IS solution and 250  $\mu$ L serum to the column at 1 mL/min, wash twice with water and once with MeCN draining the column completely after each wash, elute with 250  $\mu$ L eluting solution, centrifuge for 20 s to remove last of eluate, inject a 5  $\mu$ L aliquot of the eluate. (Prepare IS solution by adding 40  $\mu$ L 1 mg/mL N-pentyl-2,6-pipecoloxylidide (1-pentyl-N-(2,6-dimethylphenyl)-2-piperidinecarboxamide, pentyl-PPX) in MeOH to 10 mL 100 mM  $\text{NaH}_2\text{PO}_4$ . Eluting solution was 2.5 mL 35% perchloric acid in 100 mL MeOH.)

---

**HPLC VARIABLES**

**Guard column:** 15  $\times$  3.2 7  $\mu$ m RP-8 (Applied Biosystems)

**Column:** 150  $\times$  4.6 5  $\mu$ m Ultrasphere octyl

**Mobile phase:** MeCN:10 mM  $\text{KH}_2\text{PO}_4$  25:80, pH 5.2

**Flow rate:** 1.5

**Injection volume:** 5

**Detector:** UV 205

---

**CHROMATOGRAM**

**Retention time:** 4.3

**Internal standard:** N-pentyl-2,6-pipecoloxylidide (1-pentyl-N-(2,6-dimethylphenyl)-2-piperidinecarboxamide, pentyl-PPX) (14.5)

---

**OTHER SUBSTANCES**

**Extracted:** bupivacaine, mepivacaine, fentanyl

**Noninterfering:** acetaminophen, codeine, epinephrine, morphine, diazepam

---

**KEY WORDS**

serum; SPE

---

**REFERENCE**

Gupta,R.N.; Dauphin,A. Column liquid chromatographic determination of bupivacaine in human serum using solid-phase extraction, *J.Chromatogr.B*, **1994**, *658*, 113–119.

---

**SAMPLE**

**Matrix:** blood

**Sample preparation:** 2 mL Whole blood or plasma + 2 mL buffer + 5 mL chloroform:isopropanol:n-heptane 60:14:26, shake gently horizontally for 10 min, centrifuge at 2800 g for 10 min. Remove the lower organic layer and evaporate it to dryness under vacuum at 45°, reconstitute the residue in 100  $\mu$ L mobile phase, centrifuge at 2800 g for 5 min, inject a 50  $\mu$ L aliquot of the supernatant. (Buffer was saturated ammonium chloride solution 25% diluted with water, adjusted to pH 9.5 with 25% ammonia solution.)

---

**HPLC VARIABLES**

**Column:** 300  $\times$  3.9 4  $\mu$ m NovaPack C18

**Mobile phase:** MeOH:THF:buffer 65:5:30 (Buffer was 0.68 g/L (10 mM (sic))  $\text{KH}_2\text{PO}_4$  adjusted to pH 2.6 with concentrated orthophosphoric acid.) (At the end of each session wash the column with water for 1 h and MeOH for 1 h, re-equilibrate for 30 min.)

**Column temperature:** 30

**Flow rate:** 0.8

**Injection volume:** 50

**Detector:** UV 259

**CHROMATOGRAM****Retention time:** 4.55**Limit of detection:** <120 ng/mL**KEY WORDS**

whole blood; plasma; interferences may occur—compounds (all of which are extracted) elute in this order tenoxicam; iproniazid; methocarbamol; methotrexate; caffeine; nialamide; colchicine; cytarabine; benzoylecgonine; acetaminophen; diazoxide; dacarbazine; sulfinpyrazole; flumazenil; sulpride; morphine; atenolol; toloxatone; terbutaline; albuterol; phenobarbital; ranitidine; tiapride; phenol; chlormezanone; aspirin; metformin; ritodrine; codeine; sultopride; amisulpride; naltrexone; lisinopril; benzocaine; nizatidine; nalorphine; mephenesin; naloxone; sotalol; carteolol; procainamide; carbamazepine; bromazepam; nalbuphine; nadolol; procarbazine; dihydralazine; omeprazole; strychnine; acebutolol; glutethimide; chlorpropamide; glipizide; triazolam; prazosin; flunitrazepam; clonazepam; metoclopramide; melphalan; estazolam; tolbutamide; ephedrine; clonidine; pindolol; clobazam; minoxidil; disopyramide; nitrazepam; dextromethorphan; tofisopam; zopiclone; debrisoquine; sulindac; alprazolam; cycloguanil; lorazepam; methaqualone; ketamine; piroxicam; metoprolol; nifedipine; quinine; mephentermine; prilocaine; pentazocine; oxazepam; tiaprofenic acid; quinidine; celiprolol; ajmaline; yohimbine; lidocaine; secobarbital; viloxazine; mepivacaine; meperidine; doxylamine; labetalol; temazepam; amodiaquine; benperidol; droperidol; hydroxychloroquine; zolpidem; ketoprofen; alminoprofen; cicletanine; moclobemide; chloroquine; cocaine; timolol; nomifensine; ticlopidine; acenocoumarol; vandesine; mexiletine; dipyridamole; trazodone; pipamperone; pyrimethamine; benazepril; vincristine; metapramine; chlordiazepoxide; oxprenolol; warfarin; clorazepate; flecainide; phenacyclidine; thiopental; fenfluramine; metipranolol; triprolidine; naproxen; buprenorphine; verapamil; buspirone; tianeptine; midazolam; bupivacaine; carbinoxamine; loprazolam; cetirizine; chlorpheniramine; moperone; cibenzoline; medifoxamine; astemizole; vinblastine; nicardipine; bisoprolol; diltiazem; glibornuride; reserpine; aconitine; nitrendipine; diazepam; mianserin; ramipril; haloperidol; tetracaine; alprenolol; aceprometazine; glibenclamide; chlorophenacinone; doxepin; nimodipine; diphenhydramine; cyclizine; histapyrodine; phenylbutazone; demexiptiline; clozapine; proguanil; trifluoperidol; medazepam; cyamemazine; bumadizone; suriclone; propranolol; acepromazine; dothiepin; dextromoramide; fenoprofen; dextropropoxyphene; loxapine; betaxolol; propafenone; promethazine; thioproperazine; methadone; amoxapine; quinupramine; opi Pramol; cyproheptadine; brompheniramine; mefenidramine; protriptyline; flurbiprofen; tetrazepam; zorubicin; prazepam; alimemazine; loperamide; imipramine; desipramine; levomepromazine; hydroxyzine; niflumic acid; penbutolol; flvoxamine; pimozone; daunorubicin; indomethacin; maprotiline; tropatenine; etodolac; fluoxetine; amitriptyline; nortriptyline; tiocloamarol; diclofenac; mefloquine; trimipramine; chlorambucil; lidoflazine; ibuprofen; floctafenine; alpidem; loratadine; chlorpromazine; clomipramine; carpi-pramine; thioridazine; fentiazac; clemastine; mefenamic acid; fluphenazine; prochlorperazine; penfluridol; bepridil; terfenadine; trifluoperazine

**REFERENCE**

Tracqui, A.; Kintz, P.; Mangin, P. Systematic toxicological analysis using HPLC/DAD, *J. Forensic Sci.*, **1995**, *40*, 254–262.

**SAMPLE****Matrix:** blood tissue

**Sample preparation:** Blood or serum. 1 mL Blood or serum + 1 µg cianopramine + 1 mL water, vortex, add 1 mL 200 mM sodium carbonate, vortex, add 6 mL hexane:1-butanol 95:5, gently agitate for 30 min, centrifuge at 2500 g for 5 min. Remove the organic layer and add it to 100 µL 0.2% phosphoric acid, agitate gently for 30 min, centrifuge for 5 min. Remove the organic layer and inject a 30 µL aliquot of the aqueous layer. Liver homogenate. 0.5 mL Liver homogenate + 10 µg cianopramine + 500 µL 2% sodium tetraborate + 8 mL hexane:1-butanol 95:5, gently agitate for 30 min, centrifuge at 2500 g for 5 min. Remove the organic layer and add it to 400 µL 0.2% phosphoric acid, agitate gently for 30 min, centrifuge for 5 min. Remove the organic layer and inject a 30 µL aliquot of the aqueous layer.

**HPLC VARIABLES****Guard column:** 15 × 3.2 7 µm RP-18 Newguard (Applied Biosystems)**Column:** 100 × 4.6 5 µm Brownlee Spheri-5 RP-18**Mobile phase:** MeCN:100 mM NaH<sub>2</sub>PO<sub>4</sub>:diethylamine 40:57.5:2.5**Flow rate:** 2**Injection volume:** 30

**Detector:** UV 220

---

**CHROMATOGRAM**

**Retention time:** 4.89

**Internal standard:** cianopramine (8.93)

---

**OTHER SUBSTANCES**

**Simultaneous:** amitriptyline, amoxapine, benzotropine, brompheniramine, chlorpheniramine, chlorpromazine, clomipramine, cyproheptadine, desipramine, diphenhydramine, dothiepin, doxepin, fluoxetine, imipramine, loxapine, maprotiline, mesoridazine, methadone, metoclopramide, mianserin, moclobemide, nomifensine, nordoxepin, norfluoxetine, nortriptyline, pentobarbital, pheniramine, promethazine, propoxyphene, propranolol, protriptyline, quinidine, quinine, sulfuridazine, thioridazine, thiothixene, tranlylcypramine, trazodone, trihexyphenidyl, trimipramine, triprolidine

**Noninterfering:** dextromethorphan, norphethidine, phenoxybenzamine, prochlorperazine, trifluoperazine

**Interfering:** haloperidol, norpropoxyphene, northiaden

---

**KEY WORDS**

serum; whole blood; liver

---

**REFERENCE**

McIntyre, I.M.; King, C.V.; Skafidis, S.; Drummer, O.H. Dual ultraviolet wavelength high-performance liquid chromatographic method for the forensic or clinical analysis of seventeen antidepressants and some selected metabolites, *J.Chromatogr.*, **1993**, 621, 215-223.

---

**SAMPLE**

**Matrix:** blood, urine

**Sample preparation:** Serum. 1 mL Serum + 100  $\mu$ L 1  $\mu$ g/mL diphenhydramine and 1  $\mu$ g/mL nordiphenhydramine in 1 mM orthophosphoric acid + 100  $\mu$ L 1 M NaOH + 5 mL hexane, rotate at 60 rpm for 15 min, centrifuge. Remove 4 mL of the organic layer and add it to 80  $\mu$ L 1 mM orthophosphoric acid, vortex vigorously for 30 s, inject a 50  $\mu$ L aliquot of the aqueous phase. Urine. Dilute 1:10 with drug-free urine. 1 mL Diluted urine + 100  $\mu$ L 1  $\mu$ g/mL diphenhydramine and 1  $\mu$ g/mL nordiphenhydramine in 1 mM orthophosphoric acid + 1 mL saturated sodium borate (pH 10.2) + 5 mL hexane, rotate at 60 rpm for 15 min, centrifuge. Remove 4 mL of the organic layer and add it to 80  $\mu$ L 1 mM orthophosphoric acid, vortex vigorously for 30 s, inject a 50  $\mu$ L aliquot of the aqueous phase.

---

**HPLC VARIABLES**

**Guard column:** 20  $\times$  4.6 5  $\mu$ m Supelguard LC-CN cyanopropyl (Supelcosil)

**Column:** 150  $\times$  4.6 5  $\mu$ m Supelcosil LC-PCN cyanopropyl

**Mobile phase:** MeCN:MeOH:buffer 55:20:25 (Buffer was 2.6 g  $K_2HPO_4$  in 1 L water, pH adjusted to 7.0 with 900 mM orthophosphoric acid.) (Optimize the separation by adjusting the pH of the mobile phase with a few drops of 1 M NaOH or 900 mM orthophosphoric acid.)

**Flow rate:** 2.5

**Injection volume:** 50

**Detector:** UV 205

---

**CHROMATOGRAM**

**Retention time:** 1.5

**Internal standard:** diphenhydramine (1.9), nordiphenhydramine (2.9)

**Limit of detection:** 2 ng/mL

---

**OTHER SUBSTANCES**

**Extracted:** metabolites, normeperidine

---

**KEY WORDS**

serum; pharmacokinetics

---

**REFERENCE**

Meatherall, R.C.; Guay, D.R.P.; Chalmers, J.L. Analysis of meperidine and normeperidine in serum and urine by high-performance liquid chromatography, *J.Chromatogr.*, **1985**, 338, 141-149.

**SAMPLE****Matrix:** blood, urine**Sample preparation:** Add 1 mL whole blood or urine to Toxi-Tube A (Toxi-Lab, Irvine CA), add 3 mL water, mix by gentle inversion for 5 min, centrifuge at 1500 g for 5 min. Remove the organic layer and evaporate it to dryness under a stream of nitrogen at 40°, reconstitute the residue with 50  $\mu$ L MeCN:water 50:50, vortex for 10 s, centrifuge at 7500 g for 2 min, inject a 10 (urine) or 30 (blood)  $\mu$ L aliquot. (The detector wavelength shown is the wavelength of maximum absorbance. This will not necessarily be the optimal wavelength for the separation. Multiple wavelengths from 200-350 nm can be scanned using a diode-array detector. Otherwise, 220 nm may be a reasonable choice for initial work. Matrix may interfere.)

---

**HPLC VARIABLES****Guard column:** 20 mm long Symmetry C18**Column:** 250  $\times$  4.6 5  $\mu$ m Symmetry C8 (Waters)**Mobile phase:** Gradient. A was 50 mM pH 3.8 sodium phosphate buffer. B was MeCN. A:B 85:15 for 6.5 min, 65:35 for 18.5 min, 20:80 for 3 min (step gradient), re-equilibrate at initial conditions for 7 min.**Column temperature:** 30**Flow rate:** 1 for 6.5 min, to 1.5 over 18.5 min, maintain at 1.5 for 3 min (re-equilibrate at 1.5 mL/min)**Injection volume:** 10-30**Detector:** UV 200.5

---

**CHROMATOGRAM****Retention time:** 11.77

---

**KEY WORDS**whole blood

---

**REFERENCE**Gaillard,Y.; Pépin,G. Use of high-performance liquid chromatography with photodiode-array UV detection for the creation of a 600-compound library. Application to forensic toxicology, *J.Chromatogr.A*, **1997**, 763, 149-163.

---

**SAMPLE****Matrix:** formulations**Sample preparation:** Inject a 20  $\mu$ L aliquot.

---

**HPLC VARIABLES****Column:** 150  $\times$  3.9 5  $\mu$ m NovaPak phenyl**Mobile phase:** MeCN:20 mM pH 6.6 ammonium acetate 80:20**Flow rate:** 1.5**Injection volume:** 20**Detector:** UV 232

---

**CHROMATOGRAM****Retention time:** 6.7

---

**OTHER SUBSTANCES****Noninterfering:** cefazolin

---

**KEY WORDS**injections; 5% dextrose; stability-indicating

---

**REFERENCE**Lee,D.K.T.; Wong,C.-Y.; Wang,D.-P. Stability of cefazolin sodium and meperidine hydrochloride, *Am.J.Health-Syst.Pharm.*, **1996**, 53, 1608-1610.

---

**SAMPLE****Matrix:** solutions

**Sample preparation:** Weigh 95.6 mg meperidine hydrochloride and 15.0 mg ondansetron hydrochloride in a 10 mL volumetric flask, add 0.9% sodium chloride, shake vigorously for 2 min, add 0.9% sodium chloride to volume. Dilute 1:2.5, 1:7.5, and 1:15, inject a 20  $\mu$ L aliquot.

---

#### HPLC VARIABLES

**Column:** 220  $\times$  4.6 5  $\mu$ m underivatized silica column (Brownlee Silica Applied Biosystems, Inc., San Jose)

**Mobile phase:** MeOH:10 mM pH 4.0 aqueous monobasic potassium phosphate (adjusted with 10% phosphoric acid) 40:60

**Flow rate:** 1

**Injection volume:** 20

**Detector:** UV 254

---

#### CHROMATOGRAM

**Retention time:** 8.8

**Limit of detection:** 1730 ng/mL

---

#### OTHER SUBSTANCES

**Simultaneous:** ondansetron

---

#### REFERENCE

Venkateshwaran, T.G.; Stewart, J.T.; King, D.T. HPLC determination of morphine-ondansetron and meperidine-ondansetron mixtures in 0.9% sodium chloride injection, *J. Liq. Chromatogr. Rel. Technol.*, **1996**, 19, 1329–1338.

---

#### SAMPLE

**Matrix:** solutions

**Sample preparation:** Dissolve in MeOH at a concentration of 1 mg/mL, inject a 20  $\mu$ L aliquot.

---

#### HPLC VARIABLES

**Column:** 250  $\times$  5 Spherisorb S5W

**Mobile phase:** MeOH:buffer 90:10 (Buffer was 94 mL 35% ammonia and 21.5 mL 70% nitric acid in 884 mL water, adjust the pH to 10.1 with ammonia.)

**Flow rate:** 2

**Injection volume:** 20

**Detector:** UV 254

---

#### CHROMATOGRAM

**Retention time:** 2.05

---

#### OTHER SUBSTANCES

**Simultaneous:** acetylcodeine, monoacetylmorphine, thebacon, oxycodone, thebaine, norlevorphanol, methadone, benzylmorphine, ethylmorphine, morphine-N-oxide, codeine, codeine-N-oxide, morphine, ethoheptazine, morphine-3-glucuronide, pholcodeine, norpethidine, hydrocodone, dihydrocodeine, dihydromorphine, levorphanol, norcodeine, normorphine pemoline, benzphetamine, diethylpropion, mazindol, tranlycypromine, caffeine, fenethyline, phendimetrazine, methylphenidate, phenelzine, fencamfamin, chlorphentermine, norpseudoephedrine, phentermine, fenfluramine, methylenedioxymphetamine, amphetamine, normetanephrine, 4-hydroxyamphetamine, bromo-STP, STP, prolintane, 2-phenethylamine, tyramine, trimethoxymphetamine, phenylephrine, pseudoephedrine, ephedrine, methylephedrine, dimethylamphetamine, methamphetamine, mescaline, mephentermine, buprenorphine, dextromoramide, phenoperidine, fentanyl, etorphine, piritramide, noscapine, papaverine, naloxone, dextropropoxyphene, nalorphine, phenazocine, norpipanone

**Noninterfering:** dopamine, levodopa, methylodopa, methylodopate, norepinephrine

**Interfering:** epinephrine, pipradol, phenylpropanolamine, levallorphan, hydroxypethidine, normethadone, dipipanone, diamorphine, pentazocine

---

#### REFERENCE

Law, B.; Gill, R.; Moffat, A.C. High-performance liquid chromatography retention data for 84 basic drugs of forensic interest on a silica column using an aqueous methanol eluent, *J. Chromatogr.*, **1984**, 301, 165–172.



---

**SAMPLE****Matrix:** solutions**Sample preparation:** Dissolve in mobile phase.

---

**HPLC VARIABLES****Guard column:** 15 × 3.2 7 μm Applied Biosystems pre-column**Column:** 100 × 2 10 μm μPorasil**Mobile phase:** MeCN:5 mM pH 3.75 sodium acetate 80:20**Flow rate:** 1**Injection volume:** 200**Detector:** UV 214

---

**CHROMATOGRAM****Retention time:** 11.2**Limit of detection:** 8.8 ng/mL

---

**OTHER SUBSTANCES****Simultaneous:** buprenorphine, nalbuphine, ethylmorphine, morphine, codeine, fentanyl, butorphanol**Noninterfering:** thiopentone, succinylcholine, pancuronium, diazepam, atropine, neostigmine**Interfering:** tramadol

---

**REFERENCE**

Ho,S.-T.; Wang,J.-J.; Ho,W.; Hu,O.Y.-P. Determination of buprenorphine by high-performance liquid chromatography with fluorescence detection: application to human and rabbit pharmacokinetic studies, *J.Chromatogr.*, **1991**, 570, 339–350.

---

**SAMPLE****Matrix:** solutions

---

**HPLC VARIABLES****Column:** 150 × 4.6 Supelcosil LC-ABZ**Mobile phase:** MeCN:25 mM pH 6.9 potassium phosphate buffer 35:65**Flow rate:** 1.5**Injection volume:** 25**Detector:** UV 254

---

**CHROMATOGRAM****Retention time:** 4.216

---

**OTHER SUBSTANCES**

**Also analyzed:** 6-acetylmorphine, amiloride, amphetamine, benzocaine, benzoylecgonine, caffeine, cocaine, codeine, doxylamine, fluoxetine, glutethimide, hexobarbital, hypoxanthine, levorphanol, LSD, mephobarbital, methadone, methylphenidate, methypylon, N-norcodeine, oxazepam, oxycodone, phenylpropanolamine, prilocaine, procaine, terfenadine

---

**REFERENCE**

Ascah,T.L. Improved separations of alkaloid drugs and other substances of abuse using Supelcosil LC-ABZ column, *Supelco Reporter*, **1993**, 12(3), 18–21.

---

**SAMPLE****Matrix:** solutions

---

**HPLC VARIABLES****Column:** 250 × 4.6 Zorbax RX

**Mobile phase:** Gradient. A was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 1 L water. B was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 200 mL water, make up to 1 L with MeCN. A:B from 100:0 to 0:100 over 30 min, maintain at 0:100 for 5 min.

**Column temperature:** 30

Flow rate: 2

Detector: UV 210

## OTHER SUBSTANCES

**Also analyzed:** acepromazine, acetaminophen, acetophenazine, albuterol, aminophylline, amitrityline, amobarbital, amoxapine, amphetamine, amylocaine, antipyrine, aprobarbital, aspirin, atenolol, atropine, avermectin, barbital, benzocaine, benzoic acid, benzotropine, benzphetamine, berberine, bibucaine, bromazepam, brompheniramine, buprenorphine, buspirone, butabarbital, butacaine, butethal, caffeine, carbamazepine, carbromal, chloramphenicol, chlor-diazepoxide, chloroquine, chlorothiazide, chloroxylenol, chlorphenesin, chlorpheniramine, chlorpromazine, chlorpropamide, chlortetracycline, cimetidine, cinchonidine, cinchonine, clenbuterol, clonazepam, clonixin, clorazepate, cocaine, codeine, colchicine, cortisone, coumarin, cyclazocine, cyclobenzaprine, cyclothiazide, cyheptamide, cymarin, danazol, danthron, dapsone, debrisoquine, desipramine, dexamethasone, dextromethorphan, dextropropoxyphene, diamorphine, diazepam, diclofenac, diethylpropion, diethylstilbestrol, diflunisal, digitoxin, digoxin, diltiazem, diphenhydramine, diphenoxylate, diprenorphine, dipyrone, disulfiram, dopamine, doxapram, doxepin, dronabinol, ephedrine, epinephrine, epinine, estradiol, estriol, estrone, ethacrynic acid, ethosuximide, etonitazene, etorphine, eugenol, famotidine, fenbendazole, fencamfamine, fenpropfen, fenproporex, fentanyl, flubendazole, flufenamic acid, flunitrazepam, 5-fluorouracil, fluoxymesterone, fluphenazine, furosemide, gentisic acid, gitoxigenin, glipizide, glunixin, glutethimide, glybenclamide, guaiaacol, halazepam, haloperidol, hydrochlorothiazide, hydrocodone, hydrocortisone, hydromorphone, hydroxyquinoline, ibogaine, ibuprofen, iminostilbene, imipramine, indomethacin, isocarboxtyril, isocarboxazid, isoniazid, isoproterenol, isoxsuprine, ivermectin, ketamine, ketoprofen, kynurenic acid, levorphanol, lidocaine, lorazepam, lormetazepam, loxapine, mazindol, mebendazole, meclizine, meclofenamic acid, medazepam, mefenamic acid, megestrol, mephentermine, mephenytoin, mephesin, mephobarbital, mepivacaine, mescaline, mesoridazine, methadone, methamphetamine, methapyrilene, methaqualone, methazolamide, methocarbamol, methoxamine, methsuximide, methyl salicylate, methyl dopa, methyl dopamine, methylphenidate, methylprednisolone, methyltestosterone, methyprylon, metoprolol, miboleron, morphine, nadolol, nalorphine, naloxone, naltrexone, naphazoline, naproxen, nefopam, niacinamide, nicotine, niacin, nifedipine, niflumic acid, nitrazepam, norepinephrine, nortriptyline, noscapine, nyldrin, oxazepam, oxycodone, oxymorphone, oxyphenbutazone, oxytetracycline, papaverine, pargyline, pemoline, pentazocine, pentobarbital, persantine, phenacetin, phenazocine, phenazopyridine, phenacyclidine, phendimetrazine, phenelzine, pheniramine, phenobarbital, phenothiazine, phensuximide, phentermine, phenylbutazone, phenylephrine, phenylpropanolamine, piperocaine, prazepam, prednisolone, primidone, probenecid, progesterone, propiomazine, propranolol, propylparaben, pseudoephedrine, puromycin, pyrilamine, pyrithyldione, quazepam, quinaldic acid, quinidine, quinine, ranitidine, recinamine, reserpine, resorcinol, saccharin, albuterol, salicylamide, salicylic acid, scopalamine, scopoletin, secobarbital, strychnine, sulfacetamide, sulfadiazine, sulfadimethoxine, sulfathiazole, sulfamerazine, sulfamethazine, sulfamethoxazole, sulfanilamide, sulfapyridine, sulfasoxazole, sulindac, tamoxifen, temazepam, testosterone, tetracaine, tetracycline, tetramisole, thebaine, theobromine, theophylline, thiabendazole, thiamine, thiamylal, thiobarbituric acid, thioridazine, thiosalicylic acid, thiothixene, thymol, tolazamide, tolazoline, tobutamide, tolmetin, tranlycypromine, triamcinolone, tribenzylamine, trichloromethiazide, trifluoperazine, trihexyphenidyl, trimethoprim, tripeleennamine, triprolidine, tropacocaine, tyramine, verapamil, vincamine, warfarin, yohimbine, zoxazolamine

## REFERENCE

Hill,D.W.; Kind,A.J. Reversed-phase solvent gradient HPLC retention indexes of drugs, *J.Anal.Toxicol.*, **1994**, 18, 233-242.

## SAMPLE

**Matrix:** solutions

## HPLC VARIABLES

**Column:** 250 × 4.6 5 µm Supelcosil LC-DP (A) or 250 × 4 5 µm LiChrospher 100 RP-8 (B)

**Mobile phase:** MeCN:0.025% phosphoric acid:buffer 25:10:5 (A) or 60:25:15 (B) (Buffer was 9 mL concentrated phosphoric acid and 10 mL triethylamine in 900 mL water, adjust pH to 3.4 with dilute phosphoric acid, make up to 1 L.)

**Flow rate:** 0.6

**Injection volume:** 25

**Detector:** UV 229

**CHROMATOGRAM****Retention time:** 9.21 (A), 4.83 (B)**OTHER SUBSTANCES**

**Also analyzed:** acebutolol, acepromazine, acetaminophen, acetazolamide, acetophenazine, albuterol, alprazolam, amitriptyline, amobarbital, amoxapine, antipyrine, atenolol, atropine, azatadine, baclofen, benzocaine, bromocriptine, brompheniramine, brotizolam, bupivacaine, buspirone, butabarbital, butalbital, caffeine, carbamazepine, cetirizine, chlorcyclizine, chlordiazepoxide, chlormezanone, chloroquine, chlorpheniramine, chlorpromazine, chlorpropamide, chlorprothixene, chlorthalidone, chlorzoxazone, cimetidine, cisapride, clomipramine, clonazepam, clonidine, clozapine, cocaine, codeine, colchicine, cyclizine, cyclobenzaprine, dantrolene, desipramine, diazepam, diclofenac, diflunisal, diltiazem, diphenhydramine, diphenidol, diphenoxylate, dipyrindamole, disopyramide, dobutamine, doxapram, doxepin, droperidol, encainide, ethidium bromide, ethopropazine, fenoprofen, fentanyl, flavoxate, fluoxetine, fluphenazine, flurazepam, flurbiprofen, fluvoxamine, furosemide, glutethimide, glyburide, guaifenesin, haloperidol, homatropine, hydralazine, hydrochlorothiazide, hydrocodone, hydromorphone, hydroxychloroquine, hydroxyzine, ibuprofen, imipramine, indomethacin, ketoconazole, ketoprofen, ketorolac, labetalol, levorphanol, lidocaine, loratadine, lorazepam, lovastatin, loxapine, mazinol, mefenamic acid, mephenytoin, mepivacaine, mesoridazine, metaproterenol, methadone, methdilazine, methocarbamol, methotrexate, methotrimeprazine, methoxamine, methyl dopa, methylphenidate, metoclopramide, metolazone, metoprolol, metronidazole, midazolam, moclobemide, morphine, nadolol, nalbuphine, naloxone, naphazoline, naproxen, nifedipine, nizatidine, norepinephrine, nortriptyline, oxazepam, oxycodone, oxymetazoline, paroxetine, pemoline, pentazocine, pentobarbital, pentoxifylline, perphenazine, pheniramine, phenobarbital, phenol, phenolphthalein, phentolamine, phenylbutazone, phenyltoloxamine, phenytoin, pimizide, pindolol, piroxicam, pramoxine, prazepam, prazosin, probenecid, procainamide, procaine, prochlorperazine, procyclidine, promazine, promethazine, propafenone, propantheline, propiomazine, propofol, propranolol, protriptyline, quazepam, quinidine, quinine, racemethorphan, ranitidine, remoxipride, risperidone, salicylic acid, scopolamine, secobarbital, sertraline, sotolol, spironolactone, sulfapyrazone, sulindac, temazepam, terbutaline, terfenadine, tetracaine, theophylline, thiethylperazine, thiopental, thioridazine, thiothixene, timolol, tocinide, tolbutamide, tolmetin, trazodone, triamterene, triazolam, trifluoperazine, triflupromazine, trimetoprim, trimethoprim, trimipramine, verapamil, warfarin, xylometazoline, yohimbine, zopiclone

**KEY WORDS**

details of plasma extraction

**REFERENCE**

Koves, E.M. Use of high-performance liquid chromatography-diode array detection in forensic toxicology, *J. Chromatogr. A*, **1995**, 692, 103–119.

**SAMPLE****Matrix:** urine

**Sample preparation:** 1 mL Urine + 0.5 mL 1% trichloroacetic acid, centrifuge at 5200 g for 10 min, filter (0.2  $\mu$ m), inject 20  $\mu$ L aliquot

**HPLC VARIABLES****Column:** 250  $\times$  4 Lichrospher 5 $\mu$ m 60 RP-select B

**Mobile phase:** Gradient. MeCN:50 mM pH 3.2 potassium phosphate buffer from 10:90 to 75:25 over 7 min, hold at 75:25 for 3 min, return to 10:90 over 5 min, equilibrate at 10:90 for 5 min

**Flow rate:** 1.5**Injection volume:** 20**Detector:** UV 190–370**CHROMATOGRAM****Retention time:** 6.5**OTHER SUBSTANCES**

**Extracted:** amitriptyline, morphine, codeine, benzoylecgonine, amphetamine, norpropoxyphene, nordiazepam

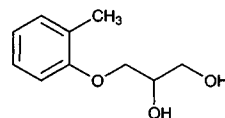
**Also analyzed:** phenylpropanolamine, lidocaine, diphenhydramine, nortriptyline, ephedrine (different gradient).

**Interfering:** cocaine

## REFERENCE

Li, S.; Gemperline, P.J.; Briley, K.; Kazmierczak, S. Identification and quantitation of drugs of abuse in urine using the generalized rank annihilation method of curve resolution, *J. Chromatogr. B*, **1994**, 655, 213–223.

# Mephenesin



**Molecular formula:** C<sub>10</sub>H<sub>14</sub>O<sub>3</sub>

**Molecular weight:** 182.22

**CAS Registry No.:** 59-47-2, 533-06-2 (carbamate)

**Merck Index:** 5895

**Lednicer No.:** 1 118

## SAMPLE

**Matrix:** blood

**Sample preparation:** 2 mL Whole blood or plasma + 2 mL buffer + 5 mL chloroform:isopropanol:n-heptane 60:14:26, shake gently horizontally for 10 min, centrifuge at 2800 g for 10 min. Remove the lower organic layer and evaporate it to dryness under vacuum at 45°, reconstitute the residue in 100 µL mobile phase, centrifuge at 2800 g for 5 min, inject a 50 µL aliquot of the supernatant. (Buffer was saturated ammonium chloride solution 25% diluted with water, adjusted to pH 9.5 with 25% ammonia solution.)

## HPLC VARIABLES

**Column:** 300 × 3.9 4 µm NovaPack C18

**Mobile phase:** MeOH:THF:buffer 65:5:30 (Buffer was 0.68 g/L (10 mM (sic)) KH<sub>2</sub>PO<sub>4</sub> adjusted to pH 2.6 with concentrated orthophosphoric acid.) (At the end of each session wash the column with water for 1 h and MeOH for 1 h, re-equilibrate for 30 min.)

**Column temperature:** 30

**Flow rate:** 0.8

**Injection volume:** 50

**Detector:** UV 272

## CHROMATOGRAM

**Retention time:** 3.53

**Limit of detection:** <120 ng/mL

## KEY WORDS

whole blood; plasma; interferences may occur—compounds (all of which are extracted) elute in this order tenoxicam; iproniazid; methocarbamol; methotrexate; caffeine; nialamide; colchicine; cytarabine; benzoylecgonine; acetaminophen; diazoxide; dacarbazine; sulfinpyrazole; flumazenil; sulpride; morphine; atenolol; toloxatone; terbutaline; albuterol; phenobarbital; ranitidine; tiapride; phenol; chlormezanone; aspirin; metformin; ritodrine; codeine; sultopride; amisulpride; naltrexone; lisinopril; benzocaine; nizatidine; nalorphine; mephenesin; naloxone; sotalol; carteolol; procainamide; carbamazepine; bromazepam; nalbuphine; nadolol; procarbazine; dihydralazine; omeprazole; strychnine; acebutolol; glutethimide; chlorpropamide; glipizide; triazolam; prazosin; flunitrazepam; clonazepam; metoclopramide; melphalan; estazolam; tolbutamide; ephedrine; clonidine; pindolol; clobazam; minoxidil; disopyramide; nitrazepam; dextromethorphan; tofisopam; zopiclone; debrisoquine; sulindac; alprazolam; cycloguanil; lorazepam; methaqualone; ketamine; piroxicam; metoprolol; nifedipine; quinine; mephentermine; prilocaine; pentazocine; oxazepam; tiaprofenic acid; quinidine; celiprolol; ajmaline; yohimbine; lidocaine; secobarbital; viloxazine; mepivacaine; meperidine; doxylamine; labetalol; temazepam; amodiaquine; benperidol; droperidol; hydroxychloroquine; zolpidem; ketoprofen; alminoprofen; cicletanine; moclobemide; chloroquine; cocaine; timolol; nomifensine; ticlopidine; ace-nocoumarol; vandesine; mexiletine; dipyrindamole; trazodone; pipamperone; pyrimethamine; benazepril; vincristine; metapramine; chlordiazepoxide; oxprenolol; warfarin; clorazepate; flecainide; phencyclidine; thiopental; fenfluramine; metipranolol; triprolidine; naproxen; buprenorphine; verapamil; buspirone; tianeptine; midazolam; bupivacaine; carbinoxamine; loprazolam; cetirizine; chlorpheniramine; moperone; cibenzoline; medifoxamine; astemizole; vinblastine; nicardipine; bisoprolol; diltiazem; glibornuride; reserpine; aconitine; nitrendipine; diazepam; mianserin; ramipril; haloperidol; tetracaine; alprenolol; aceprometazine; glibenclam-

ide; chlorophenacinone; doxepin; nimodipine; diphenhydramine; cyclizine; histapyrrodine; phenylbutazone; demexiptiline; clozapine; proguanil; trifluoperidol; medazepam; cyamemazine; bumadizone; suriclone; propranolol; acepromazine; dothiepin; dextromoramide; fenoprofen; dextropropoxyphene; loxapine; betaxolol; propafenone; promethazine; thioproperazine; methadone; amoxapine; quinupramine; opipramol; cyproheptadine; brompheniramine; mefenidramine; protriptyline; flurbiprofen; tetrazepam; zorubicin; prazepam; alimemazine; loperamide; imipramine; desipramine; levomepromazine; hydroxyzine; niflumic acid; penbutolol; fluvoxamine; pimozide; daunorubicin; indomethacin; maprotiline; tropatenine; etodolac; fluoxetine; amitriptyline; nortriptyline; tioclomarol; diclofenac; mefloquine; trimipramine; chlorambucil; lidoflazine; ibuprofen; floctafenine; alpidem; loratadine; chlorpromazine; clomipramine; carpipramine; thioridazine; fentiazac; clemastine; mefenamic acid; fluphenazine; prochlorperazine; penfluridol; bepridil; terfenadine; trifluoperazine

## REFERENCE

Tracqui, A.; Kintz, P.; Mangin, P. Systematic toxicological analysis using HPLC/DAD, *J. Forensic Sci.*, **1995**, *40*, 254–262.

## SAMPLE

**Matrix:** blood, urine

**Sample preparation:** Serum. 2 mL Serum, adjust pH to 14 with 2 M NaOH, extract twice with 6 mL diethyl ether. Combine the organic layers, dry under nitrogen, dissolve the residue in 200  $\mu$ L MeOH. Inject a 20  $\mu$ L aliquot. Urine. 5 mL Urine, adjust pH to 5 with 1 mL 2 M pH 5 sodium acetate buffer. Add 100  $\mu$ L  $\beta$ -glucuronidase (Helix pomatia 98400 U/mL), incubate at 37° overnight, cool, wash with 8 mL diethyl ether, discard the organic layer. Adjust to pH 14 with 25% NaOH, extract twice with 8 mL diethyl ether. Combine the organic layers, dry under nitrogen, reconstitute the residue in 200  $\mu$ L MeOH. Inject a 20  $\mu$ L aliquot.

## HPLC VARIABLES

**Guard column:** 4  $\times$  4 7  $\mu$ m LiChrospher 100 RP-18

**Column:** 250  $\times$  4 7  $\mu$ m LiChrospher 100 RP-18

**Mobile phase:** MeCN:1% acetic acid 20:80

**Flow rate:** 1

**Injection volume:** 20

**Detector:** UV 280

## CHROMATOGRAM

**Retention time:** 19

**Internal standard:** mephenesin

## OTHER SUBSTANCES

**Extracted:** methocarbamol

## KEY WORDS

horse; serum; mephenesin is IS

## REFERENCE

Koupai-Abyazani, M.R.; Esaw, B.; Laviolette, B. Determination of methocarbamol in equine serum and urine by high-performance liquid chromatography with ultraviolet detection and atmospheric pressure ionization-mass spectrometric confirmation, *J. Anal. Toxicol.*, **1997**, *21*, 301–305.

## SAMPLE

**Matrix:** solutions

## HPLC VARIABLES

**Column:** 250  $\times$  4.6 Zorbax RX

**Mobile phase:** Gradient. A was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 1 L water. B was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 200 mL water, make up to 1 L with MeCN. A:B from 100:0 to 0:100 over 30 min, maintain at 0:100 for 5 min.

**Column temperature:** 30

**Flow rate:** 2

**Detector:** UV 210

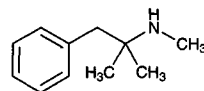
## OTHER SUBSTANCES

**Also analyzed:** acepromazine, acetaminophen, acetophenazine, albuterol, aminophylline, amitrityline, amobarbital, amoxapine, amphetamine, amylocaine, antipyrine, aprobarbital, aspirin, atenolol, atropine, avermectin, barbital, benzocaine, benzoic acid, benzotropine, benzphetamine, berberine, bibucaine, bromazepam, brompheniramine, buprenorphine, buspirone, butabarbital, butacaine, butethal, caffeine, carbamazepine, carbromal, chloramphenicol, chlor-diazepoxide, chloroquine, chlorothiazide, chloroxylenol, chlorphenesin, chlorpheniramine, chlorpromazine, chlorpropamide, chlortetracycline, cimetidine, cinchonidine, cinchonine, clenbuterol, clonazepam, clonixin, clorazepate, cocaine, codeine, colchicine, cortisone, coumarin, cyclazocine, cyclobenzaprine, cyclothiazide, cyheptamide, cymarin, danazol, danthron, dapson, debrisoquine, desipramine, dexamethasone, dextromethorphan, dextropropoxyphene, diamorphine, diazepam, diclofenac, diethylpropion, diethylstilbestrol, diflunisal, digitoxin, digoxin, diltiazem, diphenhydramine, diphenoxylate, diprenorphine, dipyrone, disulfiram, dopamine, doxapram, doxepin, dronabinol, ephedrine, ephedrine, epinephrine, epinine, estradiol, estriol, estrone, ethacrynic acid, ethosuximide, etonitazene, etorphine, eugenol, famotidine, fenbendazole, fencamfamine, fenopropfen, fenproporex, fentanyl, flubendazole, flufenamic acid, flunitrazepam, 5-fluorouracil, fluoxymesterone, fluphenazine, furosemide, gentisic acid, gitoxigenin, glipizide, glunixin, glutethimide, glybenclamide, guaiaacol, halazepam, haloperidol, hydrochlorothiazide, hydrocodone, hydrocortisone, hydromorphone, hydroxyquinoline, ibogaine, ibuprofen, iminostilbene, imipramine, indomethacin, isocarboxtyril, isocarboxazid, isoniazid, isoproterenol, isoxsuprine, ivermectin, ketamine, ketoprofen, kynurenic acid, levorphanol, lidocaine, lorazepam, lormetazepam, loxapine, mazindol, mebendazole, meclizine, meclofenamic acid, medazepam, mefenamic acid, megestrol, mepacrine, meperidine, mephentermine, mephobarbital, mepivacaine, mescaline, mesoridazine, methadone, methamphetamine, methapyrilene, methaqualone, methazolamide, methocarbamol, methoxamine, methsuximide, methyl salicylate, methyl dopa, methyl dopamine, methylphenidate, methylprednisolone, methyltestosterone, methyprylon, metoprolol, mibolerone, morphine, nadolol, nalorphine, naloxone, naltrexone, naphazoline, naproxen, nefopam, niacinamide, nicotine, niacin, nifedipine, niflumic acid, nitrazepam, norepinephrine, nortriptyline, noscapine, nylidrin, oxazepam, oxycodone, oxymorphone, oxyphenbutazone, oxytetracycline, papaverine, pargyline, pemoline, pentazocine, pentobarbital, persantine, phenacetin, phenazocine, phenazopyridine, phencyclidine, phendimetrazine, phenelzine, pheniramine, phenobarbital, phenothiazine, phensuximide, phentermine, phenylbutazone, phenylephrine, phenylpropanolamine, piperocaine, prazepam, prednisolone, primidone, probenecid, progesterone, propiomazine, propranolol, propylparaben, pseudoephedrine, puromycin, pyrilamine, pyrithyldione, quazepam, quinaldic acid, quinidine, quinine, ranitidine, recinnamine, reserpine, resorcinol, saccharin, albuterol, salicylamide, salicylic acid, scopalamine, scopoletin, secobarbital, strychnine, sulfacetamide, sufadiazine, sulfadimethoxine, sulfathiazole, sulfamerazine, sulfamethazine, sulfamethoxazole, sulfanilamide, sulfapyridine, sulfasoxazole, sulindac, tamoxifen, temazepam, testosterone, tetracaine, tetracycline, tetramisole, thebaine, theobromine, theophylline, thiabendazole, thiamine, thiamylal, thiobarbituric acid, thioridazine, thiosalicylic acid, thiothixene, thymol, tolazamide, tolazoline, tobutamide, tolmetin, tranlycypromine, triamcinolone, tribenzylamine, trichloromethiazide, trifluoperazine, trihexyphenidyl, trimethoprim, tripeleminamine, triprolidine, tropacocaine, tyramine, verapamil, vincamine, warfarin, yohimbine, zoxazolamine

## REFERENCE

Hill,D.W.; Kind,A.J. Reversed-phase solvent gradient HPLC retention indexes of drugs, *J.Anal.Toxicol.*, **1994**, *18*, 233-242.

# Mephentermine



**Molecular formula:** C<sub>11</sub>H<sub>17</sub>N

**Molecular weight:** 163.26

**CAS Registry No.:** 100-92-5, 6190-60-9 (sulfate dihydrate)

**Merck Index:** 5897

**Lednicer No.:** 1 72

## SAMPLE

**Matrix:** blood

**Sample preparation:** 2 mL Whole blood or plasma + 2 mL buffer + 5 mL chloroform:isopropanol:n-heptane 60:14:26, shake gently horizontally for 10 min, centrifuge at 2800 g for 10 min. Remove the lower organic layer and evaporate it to dryness under vacuum at 45°, reconstitute the residue in 100 µL mobile phase, centrifuge at 2800 g for 5 min, inject a 50 µL aliquot of the supernatant. (Buffer was saturated ammonium chloride solution 25% diluted with water, adjusted to pH 9.5 with 25% ammonia solution.)

#### HPLC VARIABLES

**Column:** 300 × 3.9 4 µm NovaPack C18

**Mobile phase:** MeOH:THF:buffer 65:5:30 (Buffer was 0.68 g/L (10 mM (sic)) KH<sub>2</sub>PO<sub>4</sub> adjusted to pH 2.6 with concentrated orthophosphoric acid.) (At the end of each session wash the column with water for 1 h and MeOH for 1 h, re-equilibrate for 30 min.)

**Column temperature:** 30

**Flow rate:** 0.8

**Injection volume:** 50

**Detector:** UV 259

#### CHROMATOGRAM

**Retention time:** 4.30

**Limit of detection:** <120 ng/mL

#### KEY WORDS

whole blood; plasma; interferences may occur—compounds (all of which are extracted) elute in this order tenoxicam; iproniazid; methocarbamol; methotrexate; caffeine; nialamide; colchicine; cytarabine; benzoylecgonine; acetaminophen; diazoxide; dacarbazine; sulfinpyrazole; flumazenil; sulpride; morphine; atenolol; toloxatone; terbutaline; albuterol; phenobarbital; ranitidine; tiapride; phenol; chlormezanone; aspirin; metformin; ritodrine; codeine; sultopride; amisulpride; naltrexone; lisinopril; benzocaine; nizatidine; nalorphine; mephenesin; naloxone; sotalol; car-teolol; procainamide; carbamazepine; bromazepam; nalbuphine; nadolol; procarbazine; dihy-dralazine; omeprazole; strychnine; acebutolol; glutethimide; chlorpropamide; glipizide; tri-azolam; prazosin; flunitrazepam; clonazepam; metoclopramide; melphalan; estazolam; tolbutamide; ephedrine; clonidine; pindolol; clobazam; minoxidil; disopyramide; nitrazepam; dextromethorphan; tofisopam; zopiclone; debrisoquine; sulindac; alprazolam; cycloguanil; lor-azepam; methaqualone; ketamine; piroxicam; metoprolol; nifedipine; quinine; mephentermine; prilocaine; pentazocine; oxazepam; tiaprofenic acid; quinidine; celiprolol; ajmaline; yohimbine; lidocaine; secobarbital; viloxazine; mepivacaine; meperidine; doxylamine; labetalol; temaze-pam; amodiaquine; benperidol; droperidol; hydroxychloroquine; zolpidem; ketoprofen; almino-profen; cicletanine; moclobemide; chloroquine; cocaine; timolol; nomifensine; ticlopidine; ace-nocoumarol; vandesine; mexiletine; dipyrindamole; trazodone; pipamperone; pyrimethamine; benazepril; vincristine; metapramine; chlordiazepoxide; oxprenolol; warfarin; clorazepate; fle-cainide; phenacyclidine; thiopental; fenfluramine; metipranolol; triprolidine; naproxen; bupren-orphine; verapamil; buspirone; tianeptine; midazolam; bupivacaine; carbinoxamine; loprazo-lam; cetirizine; chlorpheniramine; moperone; cibenzoline; medifoxamine; astemizole; vinblastine; nicardipine; bisoprolol; diltiazem; glibornuride; reserpine; aconitine; nitrendipine; diazepam; mianserin; ramipril; haloperidol; tetracaine; alprenolol; aceprometazine; glibenclam-ide; chlorophenacinone; doxepin; nimodipine; diphenhydramine; cyclizine; histapyrrrodine; phenylbutazone; demexiptiline; clozapine; proguanil; trifluoperidol; medazepam; cyamemazine; bumadizone; suriclone; propranolol; acepromazine; dothiepin; dextromoramide; fenoprofen; dextropropoxyphene; loxapine; betaxolol; propafenone; promethazine; thioproperazine; metha-done; amoxapine; quinupramine; opipramol; cyproheptadine; brompheniramine; mefenidra-mine; protriptyline; flurbiprofen; tetrazepam; zorubicin; prazepam; alimemazine; loperamide; imipramine; desipramine; levomepromazine; hydroxyzine; niflumic acid; penbutolol; fluvox-amine; pimozide; daunorubicin; indomethacin; maprotiline; tropatenine; etodolac; fluoxetine; amitriptyline; nortriptyline; tiocloamarol; diclofenac; mefloquine; trimipramine; chlorambucil; lidoflazine; ibuprofen; floctafenine; alpidem; loratadine; chlorpromazine; clomipramine; carpi-pramine; thioridazine; fentiazac; clemastine; mefenamic acid; fluphenazine; prochlorperazine; penfluridol; bepridil; terfenadine; trifluoperazine

#### REFERENCE

Tracqui,A.; Kintz,P.; Mangin,P. Systematic toxicological analysis using HPLC/DAD, *J.Forensic Sci.*, **1995**, *40*, 254–262.

#### SAMPLE

**Matrix:** solutions

**Sample preparation:** Prepare a 10 µg/mL solution in MeOH, inject a 20 µL aliquot.

---

#### HPLC VARIABLES

**Column:** 125 × 4.9 Spherisorb S5W silica

**Mobile phase:** MeOH containing 10 mM ammonium perchlorate and 1 mL/L 100 mM NaOH in MeOH, pH 6.7

**Flow rate:** 2

**Injection volume:** 20

**Detector:** E, LeCarbone, V25 glassy carbon electrode, + 1.2 V

---

#### CHROMATOGRAM

**Retention time:** 2.25

---

#### OTHER SUBSTANCES

**Also analyzed:** acebutolol, acepromazine, acetophenazine, N-acetylprocainamide, albuterol, alprenolol, amethocaine, amiodarone, amitriptyline, antazoline, atenolol, azacyclonal, bamethan, benactyzine, benperidol, benzethidine, benzocaine, benzocetamine, benzphetamine, benzquinamide, bromhexine, bromodiphenhydramine, bromperidol, brompheniramine, brompromazine, buclizine, bufotenine, bupivacaine, buprenorphine, butacaine, butethamate, chlorcyclizine, chlorpheniramine, chlorphenoxamine, chlorphenaline, chlorpromazine, chlorprothixene, cimetidine, cinchonidine, cinnarizine, clemastine, clomipramine, clonidine, cocaine, cyclazocine, cycizine, cyclopentamine, cyproheptadine, deserpidine, desipramine, dextromoramide, dextropropoxyphene, dicyclomine, diethylcarbamazepine, diethylpropion, diethylthiambutene, dihydroergotamine, dimethindene, dimethothiazine, diphenhydramine, diphenoxylate, dipipamnone, diprenorphine, dipyrindamole, disopyramide, dothiepin, doxapram, doxepin, doxylamine, droperidol, ephedrine, ergocornine, ergocristine, ergocristinine, ergocryptine, ergometrine, ergosine, ergosinine, ergotamine, ethopropazine, etorphine, etoxeridine, fenethazine, fenfluramine, fenoterol, fentanyl, flavoxate, fluopromazine, flupenthixol, fluphenazine, flurazepam, haloperidol, hydroxyzine, hyoscine, ibogaine, imipramine, indapamine, iprindole, isothipendyl, isoxsuprine, ketanserin, laudanosine, lidocaine, lofepramine, loxapine, maprotiline, mecamlamine, meclorphenoxate, meclozine, medazepam, mepivacaine, meptazinol, mepyramine, mesoridazine, metamamol, methadone, methamphetamine, methapyrilene, methdilazene, methotrimeprazine, methoxamine, methoxyphenamine, methoxypropazine, methylephedrine, methylergonovine, methysergide, metoclopramide, metopimazine, metoprolol, mianserin, morazone, nadolol, nalorphine, naloxone, naphazoline, nicotine, nifedipine, nomifensine, nortriptyline, noscapine, orphenadrine, oxeladin, oxprenolol, oxymetazolin, papaverine, pargyline, pecazine, penbutolol, pentazocine, penthienate, pericyazine, perphenazine, phenadoxone, phenampromide, phenazocine, phenbutrazate, phendimetrazine, phenelzine, phenglutarimide, phenindamine, pheniramine, phenmetrazine, phenomorphan, phenoperidine, phenothiazine, phenoxymazine, phentolamine, phenylephrine, phenyltoloxamine, physostigmine, pimindine, pimizide, pindolol, pipamazine, pipazethate, piperacetazine, piperidolate, pipradol, pirenzepine, piritramide, pizotifen, practolol, pramoxine, prazosin, prenylamine, prilocaine, primaquine, proadifen, procainamide, procaine, prochlorperazine, procyclidine, proheptazine, prolintane, promazine, promethazine, pronethalol, propidine, propiomazine, propranolol, prothipendyl, protriptyline, proxymetacaine, pseudoephedrine, pyrimethamine, quinidine, quinine, ranitidine, rescinnamine, sotalol, tacrine, terazosin, terbutaline, terfenadine, thenyldiamine, theophylline, thiethylperazine, thiopropazate, thioproperazine, thioridazine, thiothixene, thonzylamine, timolol, tocanide, tolpropamine, tolycaine, tranlycypromine, trazodone, trifluoperazine, trifluoperidol, trimeperidine, trimeprazine, trimethobenzamide, trimethoprim, trimipramine, tripeleminamine, triprolidine, tryptamine, verapamil, xylometazoline

---

#### REFERENCE

Jane, I.; McKinnon, A.; Flanagan, R. J. High-performance liquid chromatographic analysis of basic drugs on silica columns using non-aqueous ionic eluents. II. Application of UV, fluorescence and electrochemical oxidation detection, *J. Chromatogr.*, **1985**, 323, 191–225.

---

#### SAMPLE

**Matrix:** solutions

---

#### HPLC VARIABLES

**Column:** 250 × 4.6 Zorbax RX

**Mobile phase:** Gradient. A was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 1 L water. B was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 200



mL water, make up to 1 L with MeCN. A:B from 100:0 to 0:100 over 30 min, maintain at 0:100 for 5 min.

**Column temperature:** 30

**Flow rate:** 2

**Detector:** UV 210

## OTHER SUBSTANCES

**Also analyzed:** acepromazine, acetaminophen, acetophenazine, albuterol, aminophylline, am-triptyline, amobarbital, amoxapine, amphetamine, amylocaine, antipyrine, aprobarbital, aspirin, atenolol, atropine, avermectin, barbital, benzocaine, benzoic acid, benzotropine, benzphetamine, berberine, bibucaine, bromazepam, brompheniramine, buprenorphine, buspirone, butabarbital, butacaine, butethal, caffeine, carbamazepine, carbromal, chloramphenicol, chlor-diazepoxide, chloroquine, chlorothiazide, chloroxylenol, chlorphenesin, chlorpheniramine, chlorpromazine, chlorpropamide, chlortetracycline, cimetidine, cinchonidine, cinchonine, clenbuterol, clonazepam, clonixin, clorazepate, cocaine, codeine, colchicine, cortisone, coumarin, cyclazocine, cyclobenzaprine, cyclothiazide, cyheptamide, cymarin, danazol, danthron, dapsone, debrisoquine, desipramine, dexamethasone, dextromethorphan, dextropropoxyphene, diamorphine, diazepam, diclofenac, diethylpropion, diethylstilbestrol, diflunisal, digitoxin, digoxin, diltiazem, diphenhydramine, diphenoxylate, diprenorphine, dipyrone, disulfiram, dopamine, doxapram, doxepin, dronabinol, ephedrine, epinephrine, epinine, estradiol, estriol, estrone, ethacrynic acid, ethosuximide, etonitazene, etorphine, eugenol, famotidine, fenbendazole, fen-carfamine, fenpropfen, fenproporex, fentanyl, flubendazole, flufenamic acid, flunitrazepam, 5-fluorouracil, fluoxymesterone, fluphenazine, furosemide, gentisic acid, gitoxigenin, glipizide, glunixin, glutethimide, glybenclamide, guaiaicol, halazepam, haloperidol, hydrochlorothiazide, hydrocodone, hydrocortisone, hydromorphone, hydroxyquinoline, ibogaine, ibuprofen, iminostilbene, imipramine, indomethacin, isocarboxtyril, isocarboxazid, isoniazid, isoproterenol, isoxsuprine, ivermectin, ketamine, ketoprofen, kynurenic acid, levorphanol, lidocaine, lorazepam, lormetazepam, loxapine, mazindol, mebendazole, meclizine, meclofenamic acid, medazepam, mefenamic acid, megestrol, mepacrine, mephénytoin, mephesin, mephobarbital, mepivacaine, mescaline, mesoridazine, methadone, methamphetamine, methapyrilene, methaqualone, methazolamide, methocarbamol, methoxamine, methsuximide, methyl salicylate, methyl dopa, methyl dopamine, methylphenidate, methylprednisolone, methyltestosterone, methylprylon, metoprolol, mibolerone, morphine, nadolol, nalorphine, naloxone, naltrexone, naphazoline, naproxen, nefopam, niacinamide, nicotine, niacin, nifedipine, niflumic acid, nitrazepam, norepinephrine, nortriptyline, noscapine, nyldrin, oxazepam, oxycodone, oxymorphone, oxyphenbutazone, oxytetracycline, papaverine, pargyline, pemoline, pentazocine, pentobarbital, persantine, phenacetin, phenazocine, phenazopyridine, phenacyclidine, phendimetrazine, phenelzine, pheniramine, phenobarbital, phenothiazine, phensuximide, phentermine, phenylbutazone, phenylephrine, phenylpropanolamine, piperocaine, prazepam, prednisolone, primidone, probenecid, progesterone, propiomazine, propranolol, propylparaben, pseudoephedrine, puromycin, pyrilamine, pyrithyldione, quazepam, quinaldic acid, quinidine, quinine, ranitidine, recinnamine, reserpine, resorcinol, saccharin, albuterol, salicylamide, salicylic acid, scopolamine, scopoletin, secobarbital, strychnine, sulfacetamide, sulfadiazine, sulfadimethoxine, sulfathiazole, sulfamerazine, sulfamethazine, sulfamethoxazole, sulfanilamide, sulfapyridine, sulfasoxazole, sulindac, tamoxifen, temazepam, testosterone, tetracaine, tetracycline, tetramisole, thebaine, theobromine, theophylline, thiabendazole, thiamine, thiamylal, thiobarbituric acid, thioridazine, thiosalicylic acid, thiothixene, thymol, tolazamide, tolazoline, tobutamide, tolmetin, tranlycypromine, triamcinolone, tribenzylamine, trichloromethiazide, trifluoperazine, trihexyphenidyl, trimethoprim, tripeleonnamine, triprolidine, tropacocaine, tyramine, verapamil, vincamine, warfarin, yohimbine, zoxazolamine

## REFERENCE

Hill, D.W.; Kind, A.J. Reversed-phase solvent gradient HPLC retention indexes of drugs, *J. Anal. Toxicol.*, **1994**, *18*, 233-242.

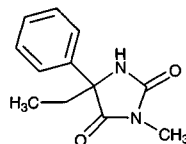
# Mephenytoin

**Molecular formula:**  $C_{12}H_{14}N_2O_2$

**Molecular weight:** 218.26

**CAS Registry No.:** 50-12-4

**Merck Index:** 5898



## SAMPLE

**Matrix:** blood

**Sample preparation:** Prepare an SPE cartridge by plugging the end of a 1 mL disposable pipette tip with glass wool and adding about 100 mg Chromosorb P/NAW. Add 50  $\mu$ L plasma then 50  $\mu$ L 10  $\mu$ g/mL tolylphenobarbital in 200 mM HCl to the SPE cartridge, let stand for 2 min, elute with 1 mL chloroform:isopropanol 6:1. Evaporate the eluate to dryness under a stream of nitrogen at 30°, reconstitute the residue in 100  $\mu$ L mobile phase, inject a 15  $\mu$ L aliquot.

## HPLC VARIABLES

**Column:** 150  $\times$  4.6 5  $\mu$ m Supelcosil-LC-8

**Mobile phase:** MeCN:water 20:80

**Flow rate:** 3.3

**Injection volume:** 15

**Detector:** UV 208

## CHROMATOGRAM

**Retention time:** 6.02

**Internal standard:** tolylphenobarbital (7.57)

**Limit of detection:** 50-100 ng/mL

## OTHER SUBSTANCES

**Extracted:** theophylline, caffeine, barbital, ethosuximide, primidone, carbamazepinediol, phenacemide, methyprylon, nirvanol, phenobarbital, chloramphenicol, butabarbital, carbamazepine epoxide, pentobarbital, amobarbital, carbamazepine, glutethimide, phenytoin, secobarbital, methaqualone

**Noninterfering:** acetaminophen, amikacin, amitriptyline, clonazepam, cyclosporine, desipramine, diazepam, digoxin, disopyramide, gentamicin, imipramine, lidocaine, methotrexate, N-acetylprocainamide, netilmicin, nortriptyline, procainamide, quinidine, salicylic acid, sulfamethoxazole, tobramycin, trimethoprim, valproic acid, p-hydroxyphenobarbital, vancomycin

## KEY WORDS

plasma; SPE

## REFERENCE

Svinarov, D.A.; Dotchev, D.C. Simultaneous liquid-chromatographic determination of some bronchodilators, anticonvulsants, chloramphenicol, and hypnotic agents, with Chromosorb P columns used for sample preparation, *Clin.Chem.*, **1989**, *35*, 1615-1618.

## SAMPLE

**Matrix:** blood, milk

**Sample preparation:** Condition a Sep-Pak C18 SPE cartridge with 5 mL water and MeOH: water 20:80. Add 5 mL 0.5% pH 6.0  $KH_2PO_4$  to 1 mL human breast milk or plasma, mix briefly, add the sample to the SPE cartridge, elute with 5 mL MeOH, evaporate the eluate to dryness, dissolve the residue in 200  $\mu$ L mobile phase, inject an aliquot.

## HPLC VARIABLES

**Column:** 150  $\times$  4.6 Develosil C8-5 (Nomura Chemicals)

**Mobile phase:** MeCN:0.5%  $KH_2PO_4$  buffer 30:70 (The pH of mobile phase was adjusted to 4.5 with 50%  $H_3PO_4$ .)

**Flow rate:** 1

**Detector:** UV 254

**CHROMATOGRAM****Retention time:** 13**Internal standard:** mephenytoin

---

**OTHER SUBSTANCES****Extracted:** phenytoin

---

**KEY WORDS**cord blood plasma; human breast milk; maternal plasma; mephenytoin is IS; human; plasma; SPE

---

**REFERENCE**

Shimoyama,R.; Ohkubo,T.; Sugawara,K.; Ogasawara,T.; Ozaki,T.; Kagiya,A.; Saito,Y. Monitoring of phenytoin in human breast milk, maternal plasma and cord blood plasma by solid-phase extraction and liquid chromatography, *J.Pharm.Biomed.Anal.*, **1998**, 17, 863–869.

---

**SAMPLE****Matrix:** solutions

---

**HPLC VARIABLES****Column:** 250 × 4.6 10 µm LiChrosorb RP18**Mobile phase:** EtOH:water 10:90 containing 10 mM α-cyclodextrin and 0.5 mM tri-O-methyl-β-cyclodextrin**Column temperature:** 25**Flow rate:** 0.95**Injection volume:** 20**Detector:** UV 254

---

**CHROMATOGRAM****Retention time:** k' 9.1, k' 10.7 (enantiomers)

---

**OTHER SUBSTANCES****Extracted:** morsuximide

---

**KEY WORDS**chiral

---

**REFERENCE**

Nowakowski,R.; Bielejewska,A.; Duszczyk,K.; Sybilska,D. Chiral discrimination by high-performance liquid chromatography with joint use of two cyclodextrin additives, *J.Chromatogr.A*, **1997**, 782, 1–11.

---

**SAMPLE****Matrix:** solutions**Sample preparation:** Prepare a solution in MeOH, inject a 5 µL aliquot.

---

**HPLC VARIABLES****Column:** 150 × 4.6 5 µm RP C18 (Beckman)**Mobile phase:** Gradient. Isopropanol:water 20:80, to 25:75 after 7 min (step gradient).**Flow rate:** 1.4**Injection volume:** 5**Detector:** UV 225

---

**CHROMATOGRAM****Retention time:** 8

---

**OTHER SUBSTANCES****Simultaneous:** phenytoin

---

**REFERENCE**

Lum,J.T.; Vassanji,N.A.; Wells,P.G. Analysis of the toxicologically relevant metabolites of phenytoin in biological samples by high-performance liquid chromatography, *J.Chromatogr.*, **1985**, 338, 242–248.

---

**SAMPLE****Matrix:** solutions**Sample preparation:** Inject a 6-10  $\mu$ L aliquot.

---

**HPLC VARIABLES****Guard column:** 20  $\times$  4.6 Supelguard LC-1 (Supelco)**Column:** 250  $\times$  4.6 5  $\mu$ m Supelcosil LC-1 (Supelco)**Mobile phase:** MeOH:MeCN:buffer 17.5:17.5:65 (Buffer was 2.72 g  $\text{KH}_2\text{PO}_4$  in 1.9 L water, pH adjusted to 6.3 with about 2 mL 1 M NaOH, made up to 2 L.)**Flow rate:** 2**Injection volume:** 6-10**Detector:** UV 204

---

**CHROMATOGRAM****Retention time:** 4.65**Internal standard:** 5-ethyl-5-p-tolybarbituric acid (tolylbarb) (4.80)

---

**OTHER SUBSTANCES****Simultaneous:** acetaminophen, acetanilide, N-acetylcysteine, N-acetylprocainamide, amobarbital, ampicillin, aspirin, barbital, butabarbital, butalbital, caffeine, carbamazepine, chloramphenicol, chlorpropamide, codeine, cyheptamide, diazoxide, diflunisal, diphylline, disopyramide, ethchlorvynol, gentisic acid, glutethimide, heptabarbital, hexobarbital, ibuprofen, indomethacin, ketoprofen, mefenamic acid, mephobarbital, methaqualone, methsuximide, methyl salicylate, methypylon, morphine, naproxen, nirvanol, oxphenylbutazone, pentobarbital, phenacetin, phenobarbital, phensuximide, phenytoin, procainamide, salicylamide, salicylic acid, secobarbital, sulfamethoxazole, sulindac, theophylline, thiopental, tolmetin, trimethoprim, vancomycin**Noninterfering:** amikacin, gentamicin, meprobamate, netilmicin, quinidine, tetracycline, tobramycin, valproic acid**Interfering:** ethosuximide, cimetidine, primidone, phenylbutazone

---

**REFERENCE**Meatherall,R.; Ford,D. Isocratic liquid chromatographic determination of theophylline, acetaminophen, chloramphenicol, caffeine, anticonvulsants, and barbiturates in serum, *Ther.Drug Monit.*, **1988**, *10*, 101-115.

---

**SAMPLE****Matrix:** solutions

---

**HPLC VARIABLES****Column:** 250  $\times$  4.6 10  $\mu$ m Chiralcel OJ**Mobile phase:** MeOH**Flow rate:** 0.5**Detector:** UV 254

---

**CHROMATOGRAM****Retention time:** 7.51 (R-(-)), 9.11 (S-(+))

---

**OTHER SUBSTANCES****Also analyzed:** mephobarbital (flow rate 1 mL/min)

---

**KEY WORDS**

chiral

---

**REFERENCE**Aboul-Enein,H.Y.; Serignese,V.; Bojarski,J. Simple chiral liquid chromatographic enantioseparation of some racemic antiepileptic drugs, *J.Liq.Chromatogr.*, **1993**, *16*, 2741-2749.

---

**SAMPLE****Matrix:** solutions

**HPLC VARIABLES****Column:** 100 × 4.6 3 µm 208HS3410 (Vydac)**Mobile phase:** Gradient. MeCN:water from 15:85 to 60:40 over 10 min.**Flow rate:** 1.5**Detector:** UV 210 (?)**CHROMATOGRAM****Retention time:** 5.4**OTHER SUBSTANCES****Simultaneous:** barbital, carbamazepine, diazepam, ethotoin, methsuximide, phenacemide, phenobarbital, phenisuximide**REFERENCE***Vydac HPLC Catalog, 1994-5, 1994, p. 26.***SAMPLE****Matrix:** solutions**HPLC VARIABLES****Column:** 250 × 4.6 Zorbax RX**Mobile phase:** Gradient. A was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 1 L water. B was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 200 mL water, make up to 1 L with MeCN. A:B from 100:0 to 0:100 over 30 min, maintain at 0:100 for 5 min.**Column temperature:** 30**Flow rate:** 2**Detector:** UV 210**OTHER SUBSTANCES****Also analyzed:** acepromazine, acetaminophen, acetophenazine, albuterol, aminophylline, amitriptyline, amobarbital, amoxapine, amphetamine, amylocaine, antipyrine, aprobarbital, aspirin, atenolol, atropine, avermectin, barbital, benzocaine, benzoic acid, benzotropine, benzphetamine, berberine, bibucaine, bromazepam, brompheniramine, buprenorphine, buspirone, butabarbital, butacaine, butethal, caffeine, carbamazepine, carbromal, chloramphenicol, chlor-diazepoxide, chloroquine, chlorothiazide, chloroxylenol, chlorphenesin, chlorpheniramine, chlorpromazine, chlorpropamide, chlortetracycline, cimetidine, cinchonidine, cinchonine, clonbuterol, clonazepam, clonixin, clorazepate, cocaine, codeine, colchicine, cortisone, coumarin, cyclazocine, cyclobenzaprine, cyclothiazide, cyheptamide, cymarin, danazol, danthron, dapsone, debrisoquine, desipramine, dexamethasone, dextromethorphan, dextropropoxyphene, diamorphine, diazepam, diclofenac, diethylpropion, diethylstilbestrol, diflunisal, digitoxin, digoxin, diltiazem, diphenhydramine, diphenoxylate, diprenorphine, dipyrone, disulfiram, dopamine, doxapram, doxepin, dronabinol, ephedrine, epinephrine, epinine, estradiol, estriol, estrone, ethacrynic acid, ethosuximide, etonitazene, etorphine, eugenol, famotidine, fenbendazole, fen-camfamine, fenopropfen, fenproporex, fentanyl, flubendazole, flufenamic acid, flunitrazepam, 5-fluorouracil, fluoxymesterone, fluphenazine, furosemide, gentisic acid, gitoxigenin, glipizide, glunixin, glutethimide, glybenclamide, guaiaicol, halazepam, haloperidol, hydrochlorothiazide, hydrocodone, hydrocortisone, hydromorphone, hydroxyquinoline, ibogaine, ibuprofen, iminostilbene, imipramine, indomethacin, isocarboxtyril, isocarboxazid, isoniazid, isoproterenol, isoxsuprine, ivermectin, ketamine, ketoprofen, kynurenic acid, levorphanol, lidocaine, lorazepam, lormetazepam, loxapine, mazindol, mebendazole, meclizine, meclofenamic acid, medazepam, mefenamic acid, megesterol, mepacrine, meperidine, mephesin, mephobarbital, mepivacaine, mescaline, mesoridazine, methadone, methamphetamine, methapyrilene, methaqualone, methazolamide, methocarbamol, methoxamine, methsuximide, methyl salicylate, methyl dopa, methyl dopamine, methylphenidate, methylprednisolone, methyltestosterone, methylprylon, metoprolol, mibolerone, morphine, nadolol, nalorphine, naloxone, naltrexone, naphazoline, naproxen, nefopam, niacinamide, nicotine, niacin, nifedipine, niflumic acid, nitrazepam, norepinephrine, nortriptyline, noscapine, nylidrin, oxazepam, oxycodone, oxymorphone, oxyphenbutazone, oxytetracycline, papaverine, pargyline, pemoline, pentazocine, pentobarbital, persantine, phenacetin, phenazocine, phenazopyridine, phencyclidine, phendimetrazine, phenelzine, pheniramine, phenobarbital, phenothiazine, phenisuximide, phentermine, phenylbutazone, phenylephrine, phenylpropanolamine, piperocaine, prazepam, prednisolone, primidone, probenecid, progesterone, propiomazine, propranolol, propylparaben, pseudoephedrine,

puromycin, pyrilamine, pyrithyldione, quazepam, quinaldic acid, quinidine, quinine, ranitidine, recinnamine, reserpine, resorcinol, saccharin, albuterol, salicylamide, salicylic acid, scopolamine, scopoletin, secobarbital, strychnine, sulfacetamide, sulfadiazine, sulfadimethoxine, sulfathiazole, sulfamerazine, sulfamethazole, sulfamethoxazole, sulfanilamide, sulfapyridine, sulfasoxazole, sulindac, tamoxifen, temazepam, testosterone, tetracaine, tetracycline, tetramisole, thebaine, theobromine, theophylline, thiabendazole, thiamine, thiamylal, thiobarbituric acid, thioridazine, thiosalicylic acid, thiothixene, thymol, tolazamide, tolazoline, tobutamide, tolmetin, tranlylcypromine, triamcinolone, tribenzylamine, trichloromethiazide, trifluoperazine, trihexyphenidyl, trimethoprim, tripeleppamine, triprolidine, tropacocaine, tyramine, verapamil, vincamine, warfarin, yohimbine, zoxazolamine

---

## REFERENCE

Hill,D.W.; Kind,A.J. Reversed-phase solvent gradient HPLC retention indexes of drugs, *J.Anal.Toxicol.*, **1994**, *18*, 233–242.

---

## SAMPLE

**Matrix:** solutions

---

## HPLC VARIABLES

**Column:** 250 × 4.6 5 µm Supelcosil LC-DP (A) or 250 × 4.5 µm LiChrospher 100 RP-8 (B)

**Mobile phase:** MeCN:0.025% phosphoric acid:buffer 25:10:5 (A) or 60:25:15 (B) (Buffer was 9 mL concentrated phosphoric acid and 10 mL triethylamine in 900 mL water, adjust pH to 3.4 with dilute phosphoric acid, make up to 1 L.)

**Flow rate:** 0.6

**Injection volume:** 25

**Detector:** UV 229

---

## CHROMATOGRAM

**Retention time:** 5.99 (A), 5.40 (B)

---

## OTHER SUBSTANCES

**Also analyzed:** acebutolol, acepromazine, acetaminophen, acetazolamide, acetophenazine, albuterol, alprazolam, amitriptyline, amobarbital, amoxapine, antipyrine, atenolol, atropine, azatadine, baclofen, benzocaine, bromocriptine, brompheniramine, brotizolam, bupivacaine, buspirone, butabarbital, butalbital, caffeine, carbamazepine, cetirizine, chlorcyclizine, chlordi-azepoxide, chlormezanone, chloroquine, chlorpheniramine, chlorpromazine, chlorpropamide, chlorprothixene, chlorthalidone, chlorzoxazone, cimetidine, cisapride, clomipramine, clonazepam, clonidine, clozapine, cocaine, codeine, colchicine, cyclizine, cyclobenzaprine, dantrolene, desipramine, diazepam, diclofenac, diflunisal, diltiazem, diphenhydramine, diphenidol, diphenoxylate, dipyrindamole, disopyramide, dobutamine, doxapram, doxepin, droperidol, encainide, ethidium bromide, ethopropazine, fenopropfen, fentanyl, flavoxate, fluoxetine, fluphenazine, flurazepam, flurbiprofen, fluvoxamine, furosemide, glutethimide, glyburide, guaifenesin, haloperidol, homatropine, hydralazine, hydrochlorothiazide, hydrocodone, hydromorphone, hydroxy-chloroquine, hydroxyzine, ibuprofen, imipramine, indomethacin, ketoconazole, ketoprofen, ketorolac, labetalol, levorphanol, lidocaine, loratadine, lorazepam, lovastatin, loxapine, mazin-dol, mefenamic acid, meperidine, mepivacaine, mesoridazine, metaproterenol, methadone, methdilazine, methocarbamol, methotrexate, methotrimeprazine, methoxamine, methyl dopa, methylphenidate, metoclopramide, metolazone, metoprolol, metronidazole, midazolam, moclo-bemide, morphine, nadolol, nalbuphine, naloxone, naphazoline, naproxen, nifedipine, nizatidine, norepinephrine, nortriptyline, oxazepam, oxycodone, oxymetazoline, paroxetine, pemo-line, pentazocine, pentobarbital, pentoxifylline, perphenazine, pheniramine, phenobarbital, phenol, phenolphthalein, phentolamine, phenylbutazone, phenyltoloxamine, phenytoin, pimo-zide, pindolol, piroxicam, pramoxine, prazepam, prazosin, probenecid, procainamide, procaine, prochlorperazine, procyclidine, promazine, promethazine, propafenone, propantheline, pro-piomazine, propofol, propranolol, protriptyline, quazepam, quinidine, quinine, racemethorphan, ranitidine, remoxipride, risperidone, salicylic acid, scopolamine, secobarbital, sertraline, so-talol, spironolactone, sulfapyrazole, sulindac, temazepam, terbutaline, terfenadine, tetra-caine, theophylline, thiethylperazine, thiopental, thioridazine, thiothixene, timolol, tocinide, tolbutamide, tolmetin, trazodone, triamterene, triazolam, trifluoperazine, trifluoromazine, tri-mepazine, trimethoprim, trimipramine, verapamil, warfarin, xylometazoline, yohimbine, zopiclone

---

## KEY WORDS

details of plasma extraction

---

**REFERENCE**

Koves,E.M. Use of high-performance liquid chromatography-diode array detection in forensic toxicology, *J.Chromatogr.A*, **1995**, 692, 103–119.

---

**SAMPLE**

**Matrix:** urine

**Sample preparation:** 200  $\mu$ L Urine + 125  $\mu$ L 200  $\mu$ g/mL IS, extract twice with 3.0 mL portions of ethyl acetate:diethyl ether 67:33. Dry combined organic phases over 200 mg anhydrous magnesium sulfate for 30 min, centrifuge. Evaporate supernatant under a stream of the nitrogen at 35°. Reconstitute residue in 500  $\mu$ L MeCN:water 20:80, inject a 5  $\mu$ L aliquot.

---

**HPLC VARIABLES**

**Column:** 250  $\times$  4.6 Zorbax C8

**Mobile phase:** MeCN:water 20:80

**Injection volume:** 5

**Detector:** UV 220

---

**CHROMATOGRAM**

**Retention time:** 21

**Internal standard:** 5-(4-hydroxyphenyl)-5-phenylhydantoin (12.2)

---

**OTHER SUBSTANCES**

**Extracted:** metabolites

---

**KEY WORDS**

metabolism

---

**REFERENCE**

Sarich,T.; Kalhorn,T.; Magee,S.; Al-sayegh,F.; Adams,S.; Slattery,J.; Goldstein,J.; Nelson,S.; Wright,J. The effect of omeprazole pretreatment on acetaminophen metabolism in rapid and slow metabolizers of S-mephenytoin, *Clin.Pharmacol.Ther.*, **1997**, 62, 21–28.

---

**SAMPLE**

**Matrix:** urine

**Sample preparation:** Condition a Sep-Pak silica SPE cartridge with 2 mL chloroform. Adjust pH of urine to 6 with 100 mM HCl or 100 mM NaOH, centrifuge. Remove a 10 mL aliquot of the supernatant and add it to 15 mL chloroform, shake for 30 s, filter (Whatman 1PS phase separating paper), add the organic filtrate to the SPE cartridge, elute with 2 mL MeOH. Evaporate the eluate to dryness under a stream of nitrogen, reconstitute the residue in 50  $\mu$ L MeOH, shake for 30 s, inject a 20  $\mu$ L aliquot.

---

**HPLC VARIABLES**

**Column:** 75  $\times$  4.5 3  $\mu$ m Supelcosil LC-8

**Mobile phase:** MeOH:100 mM pH 5.0 acetate buffer containing 10 mM  $\beta$ -cyclodextrin 20:80

**Flow rate:** 1

**Injection volume:** 20

**Detector:** UV 230

---

**CHROMATOGRAM**

**Retention time:** 8.3 (S), 9.8 (R)

**Limit of detection:** 100 ng/mL

---

**KEY WORDS**

chiral; SPE

---

**REFERENCE**

Róna,K.; Szabó,I. Determination of mephenytoin stereoselective oxidative metabolism in urine by chiral liquid chromatography employing  $\beta$ -cyclodextrin as a mobile phase additive, *J.Chromatogr.*, **1992**, 573, 173–177.

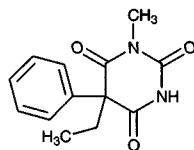
# Mephobarbital

**Molecular formula:**  $C_{13}H_{14}N_2O_3$

**Molecular weight:** 246.27

**CAS Registry No.:** 115-38-8

**Merck Index:** 5899



## SAMPLE

**Matrix:** blood

**Sample preparation:** 100  $\mu$ L Serum + 100  $\mu$ L buffer + 1.5 mL IS in 5% isopropanol in chloroform, vortex for 30 s, centrifuge. Remove the organic layer and evaporate it to dryness under a stream of air at room temperature, reconstitute the residue in 100  $\mu$ L mobile phase, inject a 6-10  $\mu$ L aliquot. (Buffer was 13.6 g  $KH_2PO_4$  in 90 mL water, pH adjusted to 6.8 with about 3 mL 10 M NaOH, made up to 100 mL.)

## HPLC VARIABLES

**Guard column:** 20  $\times$  4.6 Supelguard LC-1 (Supelco)

**Column:** 250  $\times$  4.6 5  $\mu$ m Supelcosil LC-1 (Supelco)

**Mobile phase:** MeOH:MeCN:buffer 17.5:17.5:65 (Buffer was 2.72 g  $KH_2PO_4$  in 1.9 L water, pH adjusted to 6.3 with about 2 mL 1 M NaOH, made up to 2 L.)

**Flow rate:** 2

**Injection volume:** 6-10

**Detector:** UV 204

## CHROMATOGRAM

**Retention time:** 5.60

**Internal standard:** 5-ethyl-5-p-tolylbarbituric acid (tolylbarb) (4.80)

## OTHER SUBSTANCES

**Extracted:** acetaminophen, amobarbital, barbital, caffeine, carbamazepine, chloramphenicol, ethosuximide, methsuximide, pentobarbital, phenobarbital, phenytoin, primidone, secobarbital, theophylline, thiopental

**Simultaneous:** acetanilide, N-acetylcysteine, N-acetylprocainamide, ampicillin, aspirin, butabarbital, butalbital, chlorpropamide, cimetidine, codeine, cyheptamide, diazoxide, diflunisal, diphylline, disopyramide, gentisic acid, glutethimide, heptabarbital, hexobarbital, ibuprofen, indomethacin, ketoprofen, mefenamic acid, mephentyoin, methaqualone, methsuximide, methyl salicylate, methpyrlyon, morphine, naproxen, nirvanol, oxphenylbutazone, phenacetin, phensuximide, phenylbutazone, procainamide, salicylamide, salicylic acid, sulfamethoxazole, sulindac, tolmetin, trimethoprim, vancomycin

**Noninterfering:** amikacin, gentamicin, meprobamate, netilmicin, quinidine, tetracycline, tobramycin, valproic acid

**Interfering:** ethchlorvynol

## KEY WORDS

serum

## REFERENCE

Meatherall,R.; Ford,D. Isocratic liquid chromatographic determination of theophylline, acetaminophen, chloramphenicol, caffeine, anticonvulsants, and barbiturates in serum, *Ther.Drug Monit.*, **1988**, *10*, 101-115.

## SAMPLE

**Matrix:** blood

**Sample preparation:** 500  $\mu$ L Serum + 600  $\mu$ L allobarbital in 75 mM pH 6.8 buffer, add 200 units  $\beta$ -glucuronidase (Type VII-A from *E. coli*), incubate at 37° for 30 min, add 1 mL of the sample to an Extrelut-1 SPE cartridge, after 10 min elute with 2.5 mL MTBE, dry the eluate under a stream of nitrogen, dissolve the residue in 50  $\mu$ L MeOH:water 1:1, inject a 10  $\mu$ L aliquot.

## HPLC VARIABLES

**Column:** 25  $\times$  4 4  $\mu$ m Superspher RP-18e (Merck)



**Mobile phase:** MeOH:11.2 mM  $\beta$ -cyclodextrin in 20 mM  $\text{KH}_2\text{PO}_4$  5:95

**Flow rate:** 0.8

**Injection volume:** 10

**Detector:** UV 210

---

#### CHROMATOGRAM

**Retention time:** 19 (R), 21 (S)

**Internal standard:** allobarbital (16)

**Limit of detection:** 13 ng/mL

---

#### OTHER SUBSTANCES

**Simultaneous:** phenobarbital, zonisamide

---

#### KEY WORDS

serum; SPE; chiral

---

#### REFERENCE

Eto,S.; Noda,H.; Noda,A. Simultaneous determination of antiepileptic drugs and their metabolites, including chiral compounds, via  $\beta$ -cyclodextrin inclusion complexes by a column-switching chromatographic technique, *J.Chromatogr.B*, **1994**, 658, 385–390.

---

#### SAMPLE

**Matrix:** blood

**Sample preparation:** 500  $\mu\text{L}$  Serum + 600  $\mu\text{L}$  allobarbital in 75 mM pH 6.8 phosphate buffer, add 200 units  $\beta$ -glucuronidase, heat at  $37^\circ$  for 30 min, add 1 mL of this solution to an Extrelut-1 SPE cartridge, let stand for 10 min, elute with 2.5 mL MTBE. Evaporate the eluate to dryness under a stream of nitrogen, reconstitute the residue in 50  $\mu\text{L}$  MeOH:water 50:50, inject a 10  $\mu\text{L}$  aliquot onto columns A and B in series with mobile phase A. After 12 min elute column A with mobile phase B, continue to elute column B with mobile phase A. Carbamazepine diol, carbamazepine epoxide, phenytoin, and carbamazepine elute from column A and the enantiomers of 5-(p-hydroxyphenyl)-5-phenylhydantoin and mephobarbital, phenobarbital, zonisamide, and allobarbital elute from column B. Re-equilibrate columns A and B with mobile phase A for 5 min before the next injection.

---

#### HPLC VARIABLES

**Column:** A  $250 \times 4.4 \mu\text{m}$  Superspher RP-18e (E. Merck); B  $250 \times 4.4 \mu\text{m}$  Superspher RP-18e (E. Merck)

**Mobile phase:** A MeOH:11.2 mM  $\beta$ -cyclodextrin in 20 mM  $\text{KH}_2\text{PO}_4$  5:95; B MeCN:20 mM  $\text{KH}_2\text{PO}_4$  16:84

**Flow rate:** 0.8

**Injection volume:** 10

**Detector:** A UV 210; B UV 210

---

#### CHROMATOGRAM

**Retention time:** 19 (R), 21 (S) (column B)

**Internal standard:** allobarbital (17, from column B)

**Limit of detection:** 12.8 ng/mL (S), 11.6 ng/mL (R)

---

#### OTHER SUBSTANCES

**Extracted:** carbamazepine diol, carbamazepine epoxide, carbamazepine, 5-(p-hydroxyphenyl)-5-phenylhydantoin, zonisamide, phenytoin, phenobarbital, metabolites

---

#### KEY WORDS

serum; column-switching; SPE; chiral

---

#### REFERENCE

Eto,S.; Noda,H.; Noda,A. Simultaneous determination of antiepileptic drugs and their metabolites, including chiral compounds, via  $\beta$ -cyclodextrin inclusion complexes by a column-switching chromatographic technique, *J.Chromatogr.B*, **1994**, 658, 385–390.

---

#### SAMPLE

**Matrix:** solutions

---

**HPLC VARIABLES**

**Column:** 250 × 1.5 µm LiChrosorb RP18

**Mobile phase:** EtOH:water 20:80 containing 20 mM α-cyclodextrin and 0.5 mM tri-O-methyl-α-cyclodextrin

**Column temperature:** 25

**Flow rate:** 0.04

**Injection volume:** 20

**Detector:** UV 254

---

**CHROMATOGRAM**

**Retention time:** k' 5.4, k' 6.7 (enantiomers)

---

**OTHER SUBSTANCES**

**Extracted:** glutethimide

---

**KEY WORDS**

chiral

---

**REFERENCE**

Nowakowski,R.; Bielejewska,A.; Duszczek,K.; Sybilska,D. Chiral discrimination by high-performance liquid chromatography with joint use of two cyclodextrin additives, *J.Chromatogr.A*, **1997**, 782, 1–11.

---

**SAMPLE**

**Matrix:** solutions

**Sample preparation:** Mix 50 µL of a 20–200 µg/mL solution in acetone with 50 µL of a 0.4–1.6 mg/mL solution of 2-bromo-2'-acetonaphthone in acetone, add 5–10 mg cesium carbonate, heat at 30° for 30 min, add 50 µL glacial acetic acid, mix, inject an aliquot.

---

**HPLC VARIABLES**

**Column:** 300 × 4 µm Bondapak C18

**Mobile phase:** MeOH:water 80:20

**Flow rate:** 2

**Detector:** UV 249

---

**CHROMATOGRAM**

**Retention time:** 3.1

**Limit of detection:** 1 ng

---

**OTHER SUBSTANCES**

**Simultaneous:** amobarbital, barbital, butobarbital, heptobarbital, pentobarbital, phenobarbital, secobarbital

**Interfering:** hexobarbital

---

**KEY WORDS**

derivatization

---

**REFERENCE**

Hulshoff,A.; Roseboom,H.; Renema,J. Improved detectability of barbiturates in high-performance liquid chromatography by pre-column labelling and ultraviolet detection, *J.Chromatogr.*, **1979**, 186, 535–541.

---

**SAMPLE**

**Matrix:** solutions

---

**HPLC VARIABLES**

**Column:** 250 × 4 OmniPac PAX-500 (Dionex)

**Mobile phase:** Gradient. A was MeCN:5 mM sodium carbonate 9:1. B was MeCN:20 mM sodium carbonate 20:80. A:B from 100:0 to 0:100 over 10 min.

**Flow rate:** 1

**Detector:** UV 254

---

**CHROMATOGRAM****Retention time:** 10.5

---

**OTHER SUBSTANCES****Simultaneous:** allobarbital, amobarbital, barbital, barbituric acid, butabarbital, methabarbital, methohexital, phenobarbital, phenytoin, secobarbital, thiamylal

---

**REFERENCE**Slingsby,R.W.; Rey,M. Determination of pharmaceuticals by multi-phase chromatography: Combined reversed phase and ion exchange in one column, *J.Liq.Chromatogr.*, **1990**, *13*, 107–134.

---

---

**SAMPLE****Matrix:** solutions

---

**HPLC VARIABLES****Column:** 250 × 4.6 10 µm Chiralcel OJ**Mobile phase:** MeOH**Flow rate:** 1**Detector:** UV 254

---

**CHROMATOGRAM****Retention time:** 7.38 (S-(+)), 15.76 (R-(-))

---

**OTHER SUBSTANCES****Also analyzed:** mephentyoin (flow rate 0.5 mL/min)

---

**KEY WORDS**chiral

---

**REFERENCE**Aboul-Enein,H.Y.; Serignese,V.; Bojarski,J. Simple chiral liquid chromatographic enantioseparation of some racemic antiepileptic drugs, *J.Liq.Chromatogr.*, **1993**, *16*, 2741–2749.

---

---

**SAMPLE****Matrix:** solutions

---

**HPLC VARIABLES****Column:** 150 × 4.6 Supelcosil LC-ABZ**Mobile phase:** MeCN:25 mM pH 6.9 potassium phosphate buffer 35:65**Flow rate:** 1.5**Injection volume:** 25**Detector:** UV 254

---

**CHROMATOGRAM****Retention time:** 4.128

---

**OTHER SUBSTANCES****Also analyzed:** 6-acetylmorphine, amiloride, amphetamine, benzocaine, benzoylecgonine, caffeine, cocaine, codeine, doxylamine, fluoxetine, glutethimide, hexobarbital, hypoxanthine, levorphanol, LSD, meperidine, methadone, methylphenidate, methypylon, N-norcodeine, oxazepam, oxycodone, phenylpropanolamine, prilocaine, procaine, terfenadine

---

**REFERENCE**Ascah,T.L. Improved separations of alkaloid drugs and other substances of abuse using Supelcosil LC-ABZ column, *Supelco Reporter*, **1993**, *12*(3), 18–21.

---

---

**SAMPLE****Matrix:** solutions

---

**HPLC VARIABLES**

**Column:** 300 × 3.9 µBondapak C18

**Mobile phase:** MeCN:10 mM KH<sub>2</sub>PO<sub>4</sub> + 5 mM 1-decanesulfonic acid 30:70, adjusted to pH 3.2 with 85% phosphoric acid

**Flow rate:** 1

**Injection volume:** 10

**Detector:** UV 214

---

**CHROMATOGRAM**

**Retention time:** 11.5

**Internal standard:** methyl paraben (7.0)

**Limit of detection:** 100 ng/mL

---

**OTHER SUBSTANCES**

**Simultaneous:** allobarbital, barbital, butalbital, aprobarbital, pentobarbital, phenobarbital, secobarbital, talbutal, vinbarbital

---

**KEY WORDS**

stability-indicating

---

**REFERENCE**

Ibrahim,F.B. Simultaneous determination and separation of several barbiturates and analgesic products by ion-pair high-performance liquid chromatography, *J.Liq.Chromatogr.*, **1993**, *16*, 2835–2851.

---

---

**SAMPLE**

**Matrix:** solutions

---

**HPLC VARIABLES**

**Column:** 250 × 4.5 µm LiChroCART ChiraDex (β-cyclodextrin chemically bonded to silica) (Merck)

**Mobile phase:** MeOH:water 50:50

**Column temperature:** 35

**Flow rate:** 0.5

**Detector:** UV 220

---

**CHROMATOGRAM**

**Retention time:** 13, 14 (enantiomers)

---

**KEY WORDS**

chiral

---

**REFERENCE**

Cabrera,K.; Lubda,D. Influence of temperature on chiral high-performance liquid chromatographic separations of oxazepam and Prominal on chemically bonded β-cyclodextrin as stationary phase, *J.Chromatogr.A*, **1994**, *666*, 433–438.

---

---

**SAMPLE**

**Matrix:** solutions

---

**HPLC VARIABLES**

**Column:** 250 × 4.6 Zorbax RX

**Mobile phase:** Gradient. A was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 1 L water. B was 10 mL concentrated orthophosphoric acid and 7 mL triethylamine in 200 mL water, make up to 1 L with MeCN. A:B from 100:0 to 0:100 over 30 min, maintain at 0:100 for 5 min.

**Column temperature:** 30

**Flow rate:** 2

**Detector:** UV 210

## OTHER SUBSTANCES

**Also analyzed:** acepromazine, acetaminophen, acetophenazine, albuterol, aminophylline, amitriptyline, amobarbital, amoxapine, amphetamine, amylocaine, antipyrine, aprobarbital, aspirin, atenolol, atropine, avermectin, barbital, benzocaine, benzoic acid, benzotropine, benzphetamine, berberine, bibucaine, bromazepam, brompheniramine, buprenorphine, buspirone, butabarbital, butacaine, butethal, caffeine, carbamazepine, carbromal, chloramphenicol, chlor-diazepoxide, chloroquine, chlorothiazide, chloroxylenol, chlorphenesin, chlorpheniramine, chlorpromazine, chlorpropamide, chlortetracycline, cimetidine, cinchonidine, cinchonine, clenbuterol, clonazepam, clonixin, clorazepate, cocaine, codeine, colchicine, cortisone, coumarin, cyclazocine, cyclobenzaprine, cyclothiazide, cycloheximide, cymarin, danazol, dantrolene, dapsone, debrisoquine, desipramine, dexamethasone, dextromethorphan, dextropropoxyphene, diamorphine, diazepam, diclofenac, diethylpropion, diethylstilbestrol, diflunisal, digitoxin, digoxin, diltiazem, diphenhydramine, diphenoxylate, diprenorphine, dipyrone, disulfiram, dopamine, doxapram, doxepin, dronabinol, ephedrine, epinephrine, epinine, meclizolol, estradiol, estrone, ethacrynic acid, ethosuximide, etonitazene, etorphine, eugenol, famotidine, fenbendazole, fencamfamine, fenopropfen, fenproporex, fentanyl, flubendazole, flufenamic acid, flunitrazepam, 5-fluorouracil, fluoxymesterone, fluphenazine, furosemide, gentisic acid, gitoxigenin, glipizide, glunixin, glutethimide, glybenclamide, guaiaicol, halazepam, haloperidol, hydrochlorothiazide, hydrocodone, hydrocortisone, hydromorphone, hydroxyquinoline, ibogaine, ibuprofen, iminostilbene, imipramine, indomethacin, isocarboxystyryl, isocarboxazid, isoniazid, isoproterenol, isoxsuprine, ivermectin, ketamine, ketoprofen, kynurenic acid, levorphanol, lidocaine, lorazepam, lormetazepam, loxapine, mazindol, mebendazole, meclizine, meclofenamic acid, medazepam, mefenamic acid, megestrol, mepacrine, meperidine, mephentermine, mephentoin, mepivacaine, mescaline, mesoridazine, methadone, methamphetamine, methapyrilene, methaqualone, methazolamide, methocarbamol, methoxamine, methsuximide, methyl salicylate, methyl dopa, methyl dopamine, methylphenidate, methylprednisolone, methyltestosterone, methyprylon, metoprolol, mibolerone, morphine, nadolol, nalorphine, naloxone, naltrexone, naphazoline, naproxen, nefopam, niacinamide, nicotine, niacin, nifedipine, niflumic acid, nitrazepam, norepinephrine, nortriptyline, noscapine, nylidrin, oxazepam, oxycodone, oxymorphone, oxyphenbutazone, oxytetracycline, papaverine, pargyline, pemoline, pentazocine, pentobarbital, persantine, phenacetin, phenazocine, phenazopyridine, phenacyclidine, phendimetrazine, phenelzine, pheniramine, phenobarbital, phenothiazine, phensuximide, phentermine, phenylbutazone, phenylephrine, phenylpropanolamine, piperocaine, prazepam, prednisolone, primidone, probenecid, progesterone, propiomazine, propranolol, propylparaben, pseudoephedrine, puromycin, pyrilamine, pyrithyldione, quazepam, quinaldic acid, quinidine, quinine, ranitidine, recinnamine, reserpine, resorcinol, saccharin, albuterol, salicylamide, salicylic acid, scopolamine, scopoletin, secobarbital, strychnine, sulfacetamide, sulfadiazine, sulfadimethoxine, sulfathiazole, sulfamerazine, sulfamethazine, sulfamethoxazole, sulfanilamide, sulfapyridine, sulfasoxazole, sulindac, tamoxifen, temazepam, testosterone, tetracaine, tetracycline, tetramisole, thebaine, theobromine, theophylline, thiabendazole, thiamine, thiamylal, thiobarbituric acid, thioridazine, thiosalicylic acid, thiothixene, thymol, tolazamide, tolazoline, tobutamide, tolmetin, tranlycypromine, triamcinolone, tribenzylamine, trichloromethiazide, trifluoperazine, trihexyphenidyl, trimethoprim, tripeleminamine, triprolidine, tropacocaine, tyramine, verapamil, vincamine, warfarin, yohimbine, zoxazolamine

## REFERENCE

Hill, D.W.; Kind, A.J. Reversed-phase solvent gradient HPLC retention indexes of drugs, *J. Anal. Toxicol.*, **1994**, *18*, 233-242.

## SAMPLE

**Matrix:** solutions

**Sample preparation:** Dissolve in mobile phase at a concentration of 100 µg/mL, inject a 5 µL aliquot.

## HPLC VARIABLES

**Column:** 300 × 2 µm Bondapak C18

**Mobile phase:** MeCN:water 30:70 adjusted to pH 3.0 with formic acid

**Flow rate:** 0.27

**Injection volume:** 5

**Detector:** MS, VG TRIO 2000 single quadrupole MS with EI or CI or UV 270

## KEY WORDS

mass spectra given

---

**REFERENCE**

Ryan, T.W. Identification of barbiturates using high performance liquid chromatography-particle beam EI/CI mass spectrometry, *J.Liq.Chromatogr.*, **1994**, 17, 867–881.

---

**SAMPLE**

**Matrix:** solutions

---

**HPLC VARIABLES**

**Column:** 62 × 2 packed with chiral packing (Prepare packing by dissolving 3,5-dimethylphenylcarbamate amylose in DMF, coat on Nucleosil 1000-7, dry at 60° for 3 h under reduced pressure.)

**Mobile phase:** Hexane:isopropanol 90:10

**Flow rate:** 0.1

**Injection volume:** 20

**Detector:** UV 254

---

**CHROMATOGRAM**

**Retention time:** k' 3.80

---

**KEY WORDS**

narrow-bore; chiral;  $\alpha$  1.80

---

**REFERENCE**

Chankvetadze, B.; Chankvetadze, L.; Sidamonidze, S.; Yashima, E.; Okamoto, Y. Enantioseparation of some chiral pharmaceuticals using narrow-bore liquid chromatography, *J.Pharm.Biomed.Anal.*, **1995**, 13, 695–699.

---

**SAMPLE**

**Matrix:** solutions

**Sample preparation:** Inject a 20  $\mu$ L aliquot of an 8  $\mu$ g/mL solution.

---

**HPLC VARIABLES**

**Column:** 250 × 4  $\mu$ m Superspher 100 RP-18

**Mobile phase:** EtOH:buffer containing 25 mM  $\beta$ -cyclodextrin substituted with 2-hydroxy-3-trimethylammoniumpropyl groups (Roquette Frères, Lestrem, France) (Buffer was 1.776 g/L  $\text{NaH}_2\text{PO}_4$  adjusted to pH 2.5 with orthophosphoric acid.)

**Column temperature:** 22.5

**Flow rate:** 0.6

**Injection volume:** 20

**Detector:** UV 254

---

**CHROMATOGRAM**

**Retention time:** 16.75 (-), 18.09 (+)

---

**OTHER SUBSTANCES**

**Interfering:** hexobarbital

---

**KEY WORDS**

chiral

---

**REFERENCE**

Roussel, C.; Favrou, A. Cationic  $\beta$ -cyclodextrin: a new versatile chiral additive for separation of drug enantiomers by high-performance liquid chromatography, *J.Chromatogr.A*, **1995**, 704, 67–74.